U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

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PUBLIC SESSION IN THE MATTER OF POLLUTION OF LAKE MICHIGAN AND ITS TRIBUTARY BASIN IN THE STATES OF WISCONSIN, ILLINOIS, INDIANA, AND MICHIGAN, HELD AT CHICAGO, ILLINOIS NOVEMBER 9, 1972

Environmental Protection Agency

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MICHIGAN
WISCONSIN
MICHIGAN
ILLINOIS
INDIANA

November 9, 1972
Chicago, Illinois

PUBLIC SESSION

Pollution of Lake Michigan and its Tributary Basin, Illinois, Indiana, Michigan, and Wisconsin

U.S. ENVIRONMENTAL PROTECTION AGENCY

erry/
ojt

Public Session of the Lake Michigan States and the U. S. Environmental Protection Agency convened at 9:30 a.m., November 9, 1972, in the Gold Room of the Pick-Congress Hotel, Chicago, Illinois, Mr. Francis T. Mayo, Regional Administrator, Region V of the Environmental Protection Agency, presiding.

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U. S. ENVIRONMENTAL PROTECTION AGENCY
NOVEMBER 9, 1972
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MR. MAYO: May we have your attention, ladies and gentlemen? This meeting is open. By way of introduction, I am Francis T. Mayo, Regional Administrator, Region V of the Environmental Protection Agency. I think it would be appropriate to start out by outlining the reasons for convening this public session on the control of pollution in the Lake Michigan Basin, and to suggest the objective which hopefully we can reach. As you are fully aware, we met in September pursuant to the enforcement conference provisions of the Federal Water Pollution Control Act. At that meeting a mass of evidence was presented bearing upon problems arising from phosphorus, chlorides, heavy metals, pesticides, phthalates, polychlorinated biphenyls, taste and odor, and thermal discharges. Due to the volume of testimony we were unable to conclude the conference by holding an executive session immediately after the conference proceedings, and therefore set dates in October and November for meetings of the executive session at which time we anticipated agreeing upon recommendations to be made to the Administrator of the Environmental

Protection Agency. Those recommendations would then have been transmitted to the States for implementation.

Prior to the first date set for the executive session, Congress enacted on October 18, 1972, a complete revision of the Federal Water Pollution Control Act, and among other things abolished the provision under which the enforcement conference was convened. As a result, any conclusions or recommendations which we now make will not be able to be enforced under the Federal Water Pollution Control Act.

In my judgment, it would have been undesirable not to continue with any followup to the conference session of September, and to ignore the valuable contributions made by the many people who attended. Therefore, I have asked the representatives of Illinois, Wisconsin, Michigan and Indiana to return for this informal session for the purpose of reviewing the record and possibly to arrive at some understanding as to how the problems focused upon can be resolved.

I think it is important to recognize that this is somewhat of a unique meeting because it attempts in part to bridge a gap between the former enforcement conference process and the requirements of the new legislation in a way that makes available to the public an opportunity to have exposure to the deliberations of the interested parties in matters dealing with public interest on subjects that are of vital concern with reference to the environment.

By way of conduct of the meeting, those of you who are familiar with the executive session procedure that was used under the conference mechanism, meetings were conducted as this one in public with the conferees sitting for the purpose of resolving differences and developing recommendations. The audience was in fact that, an audience, and did not participate in the deliberations. For the purpose of trying to resolve as best we can issues this morning and continuing the program this afternoon, I would like to continue with that arrangement and to the extent that time is available to provide an opportunity for statements from those who are in the audience and who desire to make statements. That is not to engage in a cross-examination procedure or to invite dialog between those in the audience and the State and Federal representatives, but rather to provide an opportunity for us to do our business in public, and then to the extent that time is available, to provide an opportunity for those in the audience to make what they feel are relevant statements on issues.

We are making the meeting today a matter of record, not as a requirement of the Federal Water Pollution Control Act in the present form, but rather as a means of seeking to continue to make available to the States and the interested parties a followup record that will relate quite specifically to the discussions and statements and the materials that were presented at the September session of the Lake Michigan Enforcement Conference, so that we do not leave that activity hanging in the air without some record of having discussed the issues that were raised at that session of the conference.

Those who may wish to obtain copies of the transcript of this meeting should contact the recorder personally, Mr. Wendell Terry, and make their individual arrangements to obtain copies of the transcript.

At this time I would like to call upon the representatives from the official State water pollution control agencies of Michigan, Illinois, Indiana and Wisconsin to introduce themselves, starting at my left, please.

MR. BLOMGREN: Carl T. Blomgren, Illinois Environmental Protection Agency.

MR. BLASER: William L. Blaser, Illinois Environmental Protection Agency.

MR. BRYSON: Dale S. Bryson, Environmental Protection Agency, Chicago.

MR. McDONALD: James O. McDonald, United States Environmental Protection Agency.

MR. PURDY: Ralph W. Purdy, Michigan Water Resources Commission.

MR. FETTEROLF: Carlos Fetterolf, Michigan Water Resources Commission.

MR. HERT: Oral H. Hert, Indiana Stream Pollution Control Board.

MR. WILLIAMS: Oliver D. Williams, Wisconsin Department of Natural Resources.

MR. McKERSIE: Jerome McKersie, Wisconsin Department of Natural Resources.

MR. MAYO: Thank you. In simplest form we have thermal and nonthermal issues to discuss. The agenda that has been made available lists the several specific subjects upon which we meet and conduct our public discussion. I think it would be appropriate for us to proceed first with the discussion of the thermal issues, and to try to conclude our discussion on those issues this morning. To the extent that the State and Federal representatives can reach some conclusion on these issues, and there is time remaining this morning before the luncheon recess, I think we could, with the consent of the other members, take time to hear statements from those of you in the audience on the thermal issue. Then following lunch, devote our time to the remaining issues on the program, and following those discussions, invite statements from the audience on that group of issues. We have not set a time to conclude the meeting. I think all of us would like to conclude these discussions today and not be faced with the necessity of reconvening this meeting tomorrow.

In order to introduce the issues dealing with the thermal questions that are before us, I think it would be appropriate for me to read for you at this point in time an EPA statement and to make it clear that the statement that is now available to you is a statement that has been participated in at both the regional level and at the Washington staff level.

The questions raised by the construction of several large powerplants on the shores of Lake Michigan have been a matter of urgent concern and have occupied countless hours of the Lake Michigan Enforcement Conference. In briefest summary I shall attempt to outline the facts underlying the problem. Six nuclear electric generating stations are in various stages of construction in the four Lake Michigan States; several of the plants are scheduled to be in full operation at various dates in 1973.

At the third session of the Lake Michigan Enforcement Conference (March 23-25, 1971) EPA Administrator Ruckelshaus proposed to the State conferees for their adoption a water quality standard whose implementation would require the installation of auxiliary cooling facilities at the nuclear powerplants under construction. The essence of Administrator Ruckelshaus' recommendation was that waste heat discharges located on Lake Michigan in excess of 1/2 billion BTU/hr which had not begun operation as of March 1, 1971, shall have closed-cycle cooling facilities associated with their operation.

Under the Federal Water Pollution Control Act as amended through 1970, water quality standards consisted of three elements: criteria, the beneficial uses to which the water was to be put, and an implementation plan geared to attain the criteria and uses. The new Federal Water Pollution Control Act states that best practicable control technology shall be achieved not later than July 1, 1977. However, if the application of best practicable control technology does not attain water quality standards, then more stringent limitations will be required. It should be noted that the water quality standards which will be considered by the Environmental Protection Agency under the new legislation for approval or disapproval, will consist only of criteria and use designations. Implementation plans are no longer subject to approval by EPA as part of water quality standards.

In place of implementation plans incorporated in the standards, the new Act imposes a continuing planning process requirement on each State which requires the State to have comprehensive control plans including implementation plans for all navigable waters within the State.

At the March 23-25, 1971 session of the Lake Michigan Enforcement Conference, the conferees made certain findings and recommendations. Most of these findings and recommendations were approved by Administrator Ruckelshaus on May 14, 1971, and forwarded to the States for implementation. Subsequent to the issuance of the approved findings and recommendations, the four Lake Michigan States took certain actions relating to implementing the conference recommendations. Basically these actions were consummated in the adoption by the States of thermal water quality standards. The principal elements of the adopted conference recommendations and those elements considered by the States for adoption as water quality standards were as follows: maximum temperature limits, specific definition of mixing zones, implementation schedules, and guides on restrictions on intake mechanisms, discharge plumes, and monitoring. The conference specifically adopted a recommendation which required closed-cycle cooling systems on all new thermal waste dischargers above a certain size.

Recognizing the risk of summarizing what each State adopted, I have attempted to do that. The summary is as follows:

Indiana: Essentially adopted all of the conference recommendations.

Illinois: Essentially adopted all of the conference recommendations with the exception of the closed-cycle cooling requirements on all plants not under construction as of January 1, 1971, and the plan of implementation on bringing older sources into compliance with the general conference recommendations.

Michigan: Essentially adopted all of the conference recommendations with the exception of the closed-cycle cooling requirements on new sources and the plan of implementation on bringing older sources into compliance with the general conference recommendations. The State did not adopt the mixing zone definition, leaving that determination to a case-by-case basis.

Wisconsin: Adopted the monthly maximum criteria exempting certain areas from the requirements. Other requirements, including mixing zone and installation of closed-cycle cooling, were not adopted.

Under the new Act the standards submitted to EPA by the four States must be approved or rejected by January 18, 1973. If EPA fails to take action by January 18, 1973, the standards submitted by the States will automatically be approved. It is EPA's intention to review and act on all of the Lake Michigan thermal standards by the required date. At this time it would appear that much of what is in the submitted standards is approvable.

This disposition of the pending thermal water quality standards will not, however, resolve the Lake Michigan thermal problem which faced the Lake Michigan Enforcement Conference in each of its sessions. We know that the thermal question is not readily resolvable, not only from our own experience but from a reading of the new Federal Water Pollution Control Amendments of 1972.

Congress considered voluminous testimony in their deliberations on the new bill. On the basis of the evidence they concluded that best practicable control technology would be required for all municipalities and industries by July 1, 1977, and best available technology by July 1, 1983. Congress obviously felt on the basis of the testimony they heard that all of the answers were not in on the question of thermal pollution. While they recognized it as a pollutant and a problem, they saw fit to address the question in a special way in various sections of the Act.

Specifically, Congress provided for the establishment of a program to start to get some answers on the thermal problem. The new Act requires the Administrator, in cooperation with State, Federal, and public and private organizations, to conduct comprehensive studies on the effects and methods of controlling thermal discharges. In evaluating alternative methods of controlling thermal discharges. In evaluating alternative methods of control, the studies are required to consider the state of the art, economic feasibility, including cost-effectiveness, and the total impact on the environment. The studies will consider methods of minimizing adverse effects and maximizing beneficial effects of thermal discharges. The results of the studies are to be reported not later than 270 days after October 18, 1972, which is the effective date of the Act, and will be generally available. The results of the studies will be considered in the permit issuing process set up by the Act in developing thermal water quality standards. (See Section 104(t)).

Basically, to control all municipal and industrial discharges, the Act establishes a national permit system superseding the program set up under the Refuse Act. EPA is to determine what best practicable control technology is for various industries, and is to set effluent limitations within 1 year. EPA is to administer the permit program until such time as a State satisfies the Administrator that it has the statutory capability to manage the program, at which time the program will be transferred by EPA to the State. (See Section 402.)

With regard to thermal pollution a special section provides that thermal discharges will be subject to the requirements of best practicable control technology with respect to existing sources and those under construction, and best available control technology with respect to new sources. If the thermal discharger can prove at a public hearing to the satisfaction of the Administrator (or a State if the permit authority has been transferred to the State) that the prescribed effluent limitation is not necessary to assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife, then the Administrator may impose a less stringent effluent limitation. (See Section 316).

A problem of great concern during past Enforcement Conference discussions has been the entrainment and destruction of aquatic biota during cooling water usage. The new statute provides that cooling water intake structures, unlike heated effluents, must immediately reflect the best technology available for minimizing adverse environmental impact.

On the basis of the new Act, the control of thermal discharges will be handled by the permit process. There are presently 27 Lake Michigan powerplants in the pre-operational and operational stage. Additionally, there are numerous other lesser thermal discharges to the lake. The Act provides for the issuance of permits in the interim before final effluent limitations are promulgated by EPA, subject to such conditions as the Administrator determines to be necessary to carry out the provisions of the Act. However desirable it may be to make an early interim decision on what the statutory requirement of best practicable control technology is, we must fully appreciate the consequences. As regards significant thermal discharges, determination of best practicable control technology should be one meant to last for a number of years since the undertaking of most thermal control programs are usually long term projects. Construction of facilities and the engineering attendant to such construction is usually extended over years rather than months.

Until the promulgation of effluent limitations required by the statute has been effected, Lake Michigan powerplant permit applications will be processed in the following manner:

1. Each permit application will initially be processed on the basis of compliance with Federally approved water quality standards. Under the statute if it is determined that best practicable control technology for thermal discharges requires more than the achievement of water quality standards such as offstream cooling, the discharger will be required to install such facilities unless the discharger can demonstrate that a less stringent effluent limitation will assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife.

2. During the term of the permit a comprehensive monitoring program will be undertaken to evaluate the effects of the thermal discharges upon the environment.

3. The permit will be issued for a relatively short period (not to exceed 3 years). However, the permit shall be terminated whenever either of the following occurs: 1) a finding that the effluent being discharged does not assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife, or 2) the promulgation of final effluent limitations

defining best practicable control technology for thermal discharges.

We must proceed to see that other questions related to cooling water usage are addressed promptly. First on this list is the requirement to have cooling water intake facilities reflecting best technology available. To develop the necessary data base on this question, EPA is suggesting the formation of a technical committee to undertake the evaluation of existing data and to make appropriate recommendations to EPA and the Lake Michigan States. It is our suggestion that the committee should consist of two representatives named by each of the States and two persons named by EPA. It is my suggestion that Dr. Robert J. Zeller, Director, Region V, EPA Surveillance and Analysis Division, chair this committee.

On another and more general problem, the EPA and the States have in the past discussed the need for adequate monitoring of programs to assess damage to the aquatic environment attributable to existing and planned cooling water uses. As required under the licensing procedures of the Atomic Energy Commission and under certain State requirements, a number of studies have been conducted to assess damage. As was discussed at the September session, it appears that criteria do not exist to trigger the installation of appropriate corrective measures should damage become evident. A mechanism is also lacking to make an overall assessment of the damage that may occur to the lake's ecosystem from waste discharges scattered at various points around the lake. This lack exists because present studies are geared toward a local, or at best regional assessment of a problem and not to the impact on the overall lake. Both monitoring elements, i.e., local and lakewide are important to assess damage to the lake. To address this problem, I suggest the formation of a technical panel to be composed of at least three representatives from each Lake Michigan State and three representatives from the EPA. The State representatives may be other than State employees and should be members of the academic community, persons employed by utilities, and members of environmental and other citizens' groups. It would be my suggestion to have Dr. Andrew McErlean, Senior Staff Biologist in the Office of Enforcement and General Counsel in Washington, to chair this technical panel. Dr. McErlean is eminently qualified to head this most important group. The charge of this panel would be:

To review background information dealing with past, present and future studies relating to thermal discharges to Lake Michigan;

To make assessments as to whether the individual studies concerning thermal discharges will adequately assess damage attributable to that cooling water use;

To assess the pertinence of individual localized studies to monitor changes in the overall lake ecosystem;

And to recommend, as necessary, additional efforts that should be expended to assess environmental effects of the use of Lake Michigan water for cooling.

I am prepared to lend such assistance as I can to fashion the kind of a program which will collect and evaluate the facts and to assure maximum protection to the public resource, as well as fair play for the industry.

I would like to acknowledge to the audience that this statement was not made available to the other members of the panel here until this morning. We were actively involved in the drafting and processing of this material through yesterday afternoon and its preparation and reproduction last evening.

As I said earlier, it represents the input from both Region V and our Washington staff. Gentlemen, I think the time is yours to respond to this material and proceed as constructively as we can on the issues that remain with us following the September session of the Lake Michigan Enforcement Conference.

MR. WILLIAMS: Mr. Chairman.

MR. MAYO: Yes.

MR. WILLIAMS: I have one question with respect to the two committees that you have recommended and the studies that you proposed. Perhaps in light of the fact that the statement has been prepared in conjunction with your Washington staff, you undoubtedly have considered this. How would these studies relate and how do they tie in directly with the overall national program which I assume the Environmental Protection Agency will be establishing since thermal issues and thermal concerns are not restricted exclusively to the Great Lakes?

MR. McDONALD: Well, I think the purpose, Mr. Williams, of appointing Dr. McErlean is because he has been actively involved in this thermal question from the national standpoint. The section in the bill that provides for comprehensive national studies, Section 104(t) of the new Act, would be something that Dr. McErlean could tie in with any specific lakewide, plant-by-plant studies that were undertaken here on Lake Michigan. The intent of the national legislation under Section 104(t), the comprehensive national studies, is a broader one and not nearly as specific as what Mr. Mayo outlined in the statement here.

MR. WILLIAMS: Is it likely or anticipated then that within the other regions of EPA that similar study groups will be impaneled, comparable studies perhaps along coastal zones?

MR. McDONALD: I think Region V, with this session, the executive session having been scheduled, is faced with coming up with what type of proposal it wanted to make regarding the solution to this very difficult thermal problem, getting it on some logical basis for the future. This is our proposal. I would think that if other regions, San Francisco, Philadelphia, and so forth, have similar type problems they may well follow this approach. I don't think we are waiting to see what the other regions will do. We have a proposal that we think may be pertinent to this particular area, and start it now.

MR. WILLIAMS: In summary then, this would be one of the positive achievements, I suppose, of the enforcement conference, the fact that we laid a good deal of groundwork over the past 3 or 4 years, and are really prepared to take off on this thermal question in a more positive way, perhaps, than other regions are.

MR. McDONALD: I think that is a good way of summing it up. You know, having been involved in past conferences, there is some substantial disagreement in the scientific community on what the damages really are in the lake, and particularly there is a dearth of information from the Federal standpoint on this. Also, there is a very important question that Mr. Mayo addressed himself to as part of this proposal, and that is getting some mechanism by which necessary backfitting if required, or offstream cooling, if required, could be triggered. I think the last session of the conference brought out there was no lakewide or uniform, State by State, certainly no Federal mechanism or criteria for really assessing what damage is and what it would mean in terms of translating it into, say, offstream cooling if required. This would be a very essential ingredient. That was to my way of thinking at the last conference one of the real weaknesses that we have that has to be solved. This study would address itself to that.

MR. PURDY: Mr. Mayo, in the statement with relation to the Federal position, you mention the control of thermal discharges will be handled by the permit process. How would, say, the controls that are required on the types of intake structures be handled?

MR. MAYO: I think it is anticipated that under the new legislation, Mr. Purdy, that these would be conditions related to thermal discharges.

MR. McDONALD: I would like to add, under Section 316 of the Act, which is labeled Thermal Discharges, this particular section on intakes is also covered in that section. So you are looking at thermal discharges not only as dicharges but the whole cycle of intake versus outflow.

MR. PURDY: Where you state the conditions upon which each permit will be processed, you are now talking about the Federal position on that, and the option is still open to the States to require any other conditions that they may require as long as they are compatible with those?

MR. McDONALD: Exactly. If the State has in fact not only compatible but more stringent conditions than this new Act, particularly in the permit and enforcement section, then those more stringent regulations of the State will apply. I think Mr. Hert in Indiana probably has the Bailly plant under more stringent requirements. Those more stringent regulations would be applicable.

MR. PURDY: You mentioned your permit would not exceed 3 years. One of our orders requires that the order of the commission be reviewed at the end of 12 years. This condition would still apply?

MR. McDONALD: The 5 years is not firm at all. It would not exceed 5 years. If it was negotiated and was more convenient for the State agency and the Federal Government to arrive at a shorter duration for a permit, I think we would do this.

MR. PURDY: The question that I have also would relate to, say, a plant that might be under construction at this point in time.

MR. McDONALD: A nuclear plant?

MR. PURDY: Nuclear plant, and a decision might be at this point in time that the once through cooling under conditions specified might be sufficient, but then when the regulations have been developed on best practicable treatment control technology, if they should include something more than that, will a time be allowed to build those facilities? And if the plant is scheduled to come into operation prior to the time that those facilities can be placed in operation, will that come under, say, this period of 1977 as an outside date? Could they operate in fact without having those facilities in operation?

MR. McDONALD: I think the crux of the statement that we have here is to try to get some logical process involved in the permit issuing business that we all have at hand as of October 18, so the dischargers, the powerplants, State and regulatory agencies, environmentalists, all have a pretty good idea of where we are going. So if a plant, for example, that is now under construction, a plant is on line, wants to be operating say next July, that plant for permit issuing processes would have to meet the water quality standards for the discharge that would go out. There might be a schedule that the discharger might have to meet, might have to do certain things with its discharge pipe, might require some off-stream cooling possibly. Then if at some later point in time after that permit is issued, subject to the water quality standards requirement, if the Administrator and when the Administrator issues his definition of best practicable treatment for powerplants, if that definition says offstream cooling, then it would be incumbent upon the Federal

Government, if we issue the permit, or you if you issue it, to so notify the individual discharger indicating that the permit that he now has is being terminated subject to developing a compliance schedule that would result in the necessary installation being constructed to control that discharge, unless he was able at a public hearing to prove he really did not need that more stringent cooling power requirement, offstream cooling. I don't think there is any intention here on behalf of the Federal Government to summarily and arbitrarily close down the plant that is once licensed. We would have a process that obviously, as you know from your experience in pollution control, you have to develop a schedule. You have to take time to build remedial facilities that are necessary. That would be our intention if we issue it. I don't know how regulatory agencies could do otherwise.

MR. PURDY: This is subject to the condition that you don't have a very gross problem. You might develop different techniques.

MR. McDONALD: Right. I think if you have an extreme problem, if an extreme problem developed, it was a gross problem, there was agreement on this or even disagreement, but there was a substantial evidence that we had a gross problem, that powerplant --obviously with the permit process you and the Federal Government would have-- it would have power to close down that plant if necessary. I think the Federal Government certainly would be prepared to do what it had to do under the statute to see that this happened if there was no agreeable schedule to control this, or it was so damaging that there had to be some shutdown of the plant. That is a good question to clarify at the outset.

MR. MAYO: May I interpose a point? Is it your understanding that once "best practicable control technology" is defined by the Administrator, this according to the Act is to be accomplished in a year's time, that then July 1, 1977, becomes a target date for the achievement of that?

MR. McDONALD: Exactly. The statute is very clear that July 1, 1977, is the date. This might mean if it takes the Administrator some time to announce this decision, that the power companies from the outset should be on notice that they may have to do some significant acceleration of work that ordinarily might take a longer period of time, if they have to install additional facilities.

MR. PURDY: However, 270 days is the outside date for the announcement of the best practicable control technology?

MR. McDONALD: No. The 270 days, I don't mean to get into the specific terms of the bill, it will be helpful if you study it later, Section 104(t) of the Act provides that within 270 days from enactment, from October 18, 1972, the Administrator must come out with the results of any studies.

MR. PURDY: My last question relates to the coordination of the studies. I am assuming that this committee would also be, say, including in its appraisal the adequacy of the studies, those that might be conducted by the Department of the Interior?

MR. McDONALD: Yes, sir, certainly would. That again would be a very essential ingredient in this study, to let this panel determine what has been done, what they feel about these things, what weaknesses there are, and then get an agreement about what holes ought to be plugged. I think the overriding worth of this study also rests on this point that Mr. Mayo pointed out; that is, there has been great concern and disagreement in the academic community on what is happening to the lake insofar as health is concerned. There has been disagreement among the consultants, reputable consultants with completely opposite viewpoints. There also has been great consternation on behalf of the environmentalists as to what is going on in the lake, their inability as they see it to participate in the decisionmaking process as to how corrective measures can be taken if indeed they are required. I think the real heart of this proposal is Mr. Mayo's proposal to set up this panel that would include a total of 15 members, three from each State, three from the Federal Government, not excluding the Environmental Protection Agency, but composing the panel of environmentalists who are concerned with this problem, who can participate in the review process, decisionmaking, set up the mechanism that may result in what they feel would be adequate protection of the lake, along with the community and the regulatory agency and the academic world.

I think we may get something here where we can get some agreement on what it takes to really assess damage, which I really think is one of the key points to be concerned with.

MR. PURDY: As we look down the road in coordinating the various programs between the States and the Federal Government on this and other matters, it appears we may have to open a Chicago office of the Michigan Water Resources Commission.

MR. McDONALD: That may be appropriate. As you look at this legislation, you can see the thrust is to turn over these things to the State. Maybe we ought to do that.

MR. BRYSON: How about an office of EPA in Lansing?

MR. FETTEROLF: In your statement, you felt that Andrew McErlean was eminently qualified to head this most important group. Would you care to expand on that?

MR. McDONALD: Why don't you stand up and identify yourself, and you know yourself better than anybody else. Why don't you identify your background and give the people here on the panel an opportunity if they would like to ask some questions, to delve into that.

The first thing you have to do with Dr. McErlean is figure out how to spell his name, and then how to pronounce it. It is spelled M-c E-r-l-e-a-n, Andrew McErlean, Ph..D.

DR. McERLEAN: My name is Andrew McErlean, Senior Staff Biologist in the Office of Enforcement and General Counsel in Washington. Prior to coming to the Environmental Protection Agency in August of this year, I have been involved with thermal studies on Chesapeake Bay, and so forth. My background is primarily marine and estuary ecology. I have been involved in the last 10 years in that type of research.

MR. McDONALD: Are there any questions?

MR. PURDY: Thank you.

MR. HERT: Mr. Mayo, on page 8 you talk about the issuance of permit applications. Item No. 2, "During the term of the permit a comprehensive monitoring program will be undertaken to evaluate the effects of the thermal discharges upon the environment." Are we talking about the power companies undertaking this monitoring program, or are we talking about EPA undertaking this assessment?

MR. MAYO: Using the essence of the second recommendation to establish the committee to oversee and overview these activities, I think that we can presume that the responsibility for the conduct of the necessary studies would be a responsibility of the utility and the cost attendant to those studies would be cost to the utility, with this overview playing an important role in signing off on the sufficiency of that study in order that, when the necessary study activities are completed, we have reasonable prospects that the interested parties are likely to be in agreement on the conclusion. That is one of the difficulties that we have at the present time. There is a divergence of opinion on the sufficiency of the studies now under way, and that divergence of opinion continues to contribute to a divergence of conclusions on the adequacy of the data to demonstrate no damage or to demonstrate that damage has taken place. One of the important things that needs to be accomplished, a continuation of the existing studies and any new studies, is to have a mechanism through which the interested parties have an opportunity to reach some conclusion on the sufficiency of the study given, and consequently, to have a reasonable opportunity to reach the same conclusions using the data that comes from the study effort.

MR. HERT: I hope they have better luck than the thermal committee that I was a member of a few months ago. We didn't seem to come to much agreement.

Also on page 9 you stated, "As was discussed at the September session, it appears that criteria do not exist to trigger the installation of appropriate corrective measures should damage become evident." I am not sure that I understand that statement. In my belief, the States have appropriate authority to take appropriate corrective measures if damage becomes evident.

MR. McDONALD: I don't think that is really the question that we have, not the capability of the State to do this, Mr. Hert. I think it was clear at that last session of the conference when we talked with AEC about what criteria, what parameters they would use to really know when damage was occurring, they said they didn't know. I think the Federal EPA feels the same. We don't know. I think from some of the State regulatory agencies that made presentations at that meeting, I think legitimately and honestly they said they don't know. I thought one thing that came out of that conference that was quite clear from all sides was that we need to get some common denominator of being able to assess what damage really is. Is it when it is 100,000 fish killed, for example, or when it is 500,000? How many organisms are in the intake structure? How far spread if it is a thermal plume? What happens to the bottom? We need these measures so we can have some uniformity in the way that we are trying to approach it, and the intent of this panel is to face up on a consensus basis, which is what it will have to be at the end ultimately--regulatory agencies, academic community, environmentalists coming up with an acceptable set of criteria as to what constitutes damage so that we can lay to rest this long time debate that we have had as to what constitutes damage to this lake. This seems to be of top priority, and I think the sense of the last conference was that most people felt this way. It is not a question of judging the capability of a State.

MR. PURDY: I would like to pursue this a little bit. I am aware of very extensive individual studies being conducted in Michigan waters, and at the last conference in particular, and earlier ones, we received reports of very extensive studies being conducted by individual dischargers in waters of, say, Illinois, Wisconsin. And I am not prepared at this time to say that those individual studies are inadequate, and in fact this committee may decide that they are adequate or that they may be conducting some overlapping work which could be dropped and some other things added. I do recognize this problem, though, of how do you take those individual studies and say what the effect is on the overall lake. This may not require anything in the way of additional studies. It is only the interpretation of the results of those individual studies, and the committee's task may be just to develop the criteria of how you assess or add up the results of the individual studies to make the assessment on the overall lake.

MR. McDONALD: I think you are correct. Again it is good that you raise it. We too are not making judgments on the adequacy of ongoing studies or studies that have been completed. But there needs to be some consensus by the various parties who are interested in this about whether that particular study is a study that we can all sort of agree on as constituting something meaningful when we get done, what will we do with it, and how does it apply to the lake. All of the studies you are doing in Michigan may well be just what ought to be done. They would be used in that framework. I think you are exactly right.

Again, your long involvement, there is one thing that keeps going on about finding something that we can all sit down and agree on so that they can spend their time on other pollution endeavors. This provides a hope for the future.

MR. FETTEROLF: Mr. Chairman, I am not sure whether I am congratulating you, your staff, or both. I certainly think that this interpretation/explanation is laid out very well. It certainly is a marvelous first copy to look at some of these problems and issues.

Relative to page 5 where Congress is going to provide the establishment of a program to get the answers on the thermal problem, and they allow themselves 270 days from October 18, this program is going to be paperwork, not a field program. There is no way you can mount a field program and come up with answers that will be new or unique in that length of time. I don't see what sort of structure this program will have, and perhaps that is up to the Administrator to establish in the very near future if he expects to get anything done in 270 days. I hope that he goes outside of EPA as well as inside to secure some of these answers. I feel these answers are available. I feel that many of the biological aspects of it will appear in the revision of water quality criteria which has recently been completed by the National Academy of Sciences. I feel the information there reflects a view of the effects of thermal discharges and ways to get around these damages. So I would certainly hope that people who devoted great amounts of time in coming up with some of the answers, their work, the work done in the last 2 years, that will be included in the group that the Administrator uses to solve this problem. I would hope that the State of Michigan could hear from the Administrator on what his plans are in composing this group that is going to provide him with the answers in 270 days.

MR. MAYO: It is interesting to note that the Congress did not set the 270 day target date for itself. It set the target date for somebody else.

MR. FETTEROLF: Yes. Well, I have a couple of other comments to make.

Oral Hert mentioned the Lake Michigan Technical Committee for Thermal Discharges. As I look around the room, there are six members of that technical committee here. That technical committee was very disappointed when this enforcement conference chose to overlook many of their recommendations. I was particularly frustrated by it because I thought they were pretty good recommendations. I feel that we have been somehow vindicated because what is in this paper you have before you includes many of the things that we recommended. We are very pleased there has been a little comeback, a little more logical approach to the situation. Would you agree, Mr. Blomgren?

MR. BLOMGREN: Yes, sir.

MR. McDONALD: What are you laughing at?

MR. BLOMGREN: It took 3 years to say that.

MR. PURDY: As far as I can see, Mr. Mayo, the statement that you have placed before us recognizes the mandate of Congress in the passing of the new water act, and I think we ought to proceed on to other matters.

MR. MAYO: We would like to get at least a concurrence in terms of agreement with the two basic recommendations that were made in the report, and at least a sense of commitment on the part of the individual States to participate very thoroughly and actively in the two study efforts.

MR. PURDY: We agree. We have participated in the past. We will participate in the future.

MR. MAYO: Are there any other comments?

MR. FETTEROLF: Mr. Mayo, on page 6, the last paragraph: "The new statute provides that cooling water intake structures, unlike heated effluents, must immediately reflect the best technology available for minimizing adverse environmental impact." There will be a technical committee which will look into this, I take it, and whether it is ecologically, environmentally, biologically necessary or not, the statute says it shall be done, is that correct?

MR. McDONALD: That is absolutely right.

MR. FETTEROLF: It is easy to work with the law if you know what the law is, and we can proceed from there. You don't have to make a decision on whether it is environmentally important that this be done. The law has made the decision for us. We can proceed from that point. I have a feeling that the Technical Committee in assessing the situation will also want to address themselves to water intake structures, not just water cooling uses, but for municipal usage as well.

MR. BLASER: Mr. Chairman, we obviously will participate in Illinois, and we are anxious to move on to other business.

MR. McDONALD: Mr. Mayo, how do we leave this? Who is going to get in touch with whom and when?

MR. MAYO: Well, we have from the Environmental

Protection Agency's standpoint indicated our willingness to accept the chairmanship responsibility. I think it then falls on us to start the mechanics of getting both of these committees into operation, which should include as a very first step the communication to the States to designate their respective membership, and it may be quite appropriate for the States to have some discussion on that point, because as long as there is a desire to get a sufficient breadth of interest from the public, and from industry, I think it may be very desirable for the States to attempt to divide up their respective participation in a way that develops that balance. You may not be able to get it in terms of three people from each State, to get the breadth of interest that ought to be acknowledged here, State interest, academic interest, public interest, utility interest. We could suggest that you have that kind of a discussion, and we can provide you a mechanism for doing that. Get the membership established, and I think we would be willing to do the early spade work on drafting the plan of action or a program of action that these two committees could address themselves to as quickly as they could be formed. Does that seem reasonable?

MR. HERT: Yes. Mr. Mayo, the second committee which proposes State representatives other than State employees, is it your thinking Dr. Zeller's committee could also include other than State employees?

MR. MAYO: It may very well. We will accept the responsibility then of proceeding as expeditiously as possible.

As indicated this morning, to the extent that there was going to be time available, it would seem appropriate to get statements from the audience on the thermal issue. We have had the benefit of the dialog here. It may indeed be of substance to the audience to make some related comments. I would like to have some of your suggestions there. We might do that until perhaps 11:30.

MR. HERT: I would suggest that since we have restricted our comments to material that was presented by the Environmental Protection Agency, that those in the audience also restrict their comments to similar information.

MR. MAYO: To the thermal issue.

MR. HERT: Not to presenting additional material at this time, only comments on the material under discussion this morning.

MR. MAYO: How do you feel about that, gentlemen? I think we ought to have time to go until 11:30. If that is desirable, then go to lunch, get back here early, say 1:00 o'clock at the latest.

In order to proceed-- I am looking at the microphone situation, we don't have a floor microphone--I think it would be helpful to take one of the end microphones and ask whoever wishes to make a statement to come forward to the end of the table and I think just hold the microphone in hand for the purpose of making the statement to be sure that what is said is clearly heard in the room.

We are available, ladies and gentlemen, to have your statements on the issues that we have discussed so far this morning. As you come forward, please identify yourself, your name and any affiliation that you may wish to have acknowledged in the record.

MR. PETER SCULLEN: My name is Peter Scullen and I represent Commonwealth Edison. I have a rebuttal statement by D. W. Pritchard on Dr. M. A. Shirazi's review of the analysis of the sinking plume phenomena, and I would like this entered in the record as if we had read it, and we will pass out copies. Is that acceptable?

MR. MAYO: Please make a copy available to the recorder.

(The statement referred to is appended to the transcript.)

MR. BRYSON: In order to clarify what has been presented, following the last session of the conference EPA did a review of some of the statements that were presented at the September session. Dr. Shirazi reviewed the statement by Mr. Pritchard. He is on the staff of the EPA. Dr. Shirazi developed the comments which were distributed to the conferees and interested parties as necessary. Mr. Chairman, I would like to suggest that Dr. Shirazi's comments be entered into the record so it is clear what is being rebutted.

MR. MAYO: We will provide the reporter with a copy.

(The statement referred to is appended to the transcript.)

MR. MAYO: The time is yours, ladies and gentlemen.

MR. ELA: My name is Jonathan Ela, Midwest Representative of the Sierra Club. We have not had an opportunity to review Mr. Mayo's statement in any great detail since we read it first this morning, nor to tie it in in a definitive way with the new clean water act just passed by Congress. With this caution, however, it seemed very difficult to interpret the statement as anything other than complete capitulation to the interests of the utilities and the other dischargers of thermal pollutants into Lake Michigan. At the last session of the enforcement conference in September, we were told that the Environmental Protection Agency had a position. It was a very forceful position, developed over several years. It is truly ironic that, now that the Federal Environmental Protection Agency has the statutory authority to enforce its own position, it seems to have retreated from it in a series of somersaults that can be regarded as cataclysmic from the point of view of the environment. We have been alarmed with the statements heard this morning, for it seems to indicate that plants under construction will be given nearly automatically the permit that they require for the foreseeable future for unlimited discharges of hot water into Lake Michigan, and that only after a period of review that will go on for something like 3 years will this matter be reconsidered. There is not much comfort to be gained from history in these ex post facto review period analyses over existing pollutants. It seems very unlikely that 3 years from now or 5 years from now, after the plant has been operating for a period of years, there will be any agency that will enforce cooling towers or other backfitting to these plants. We must be pessimistic on the basis of what we have heard that the real problem of thermal pollution of the lake will be met by the authorities. It is alarming to read the definition of best practicable technology that seems to be in the statement this morning. There are, of course, powerplants throughout the United States that are operating, operating economically, with cooling systems of various sorts. It appears, however, that for the future the interests along the Great Lakes will not be required to practice these same technologies. If this weak, to say the least, definition of best practicable technology is going to spread over into other areas of pollution as the Environmental Protection Agency seeks to implement the Federal Water Pollution Control Act as recently passed by Congress, it seems instead of having a great victory on the passage of that Act, we have taken a big step backwards. We hope this is not the case, and we certainly hope that the Environmental Protection Agency will show more fortitude in meeting the problems of thermal pollution in Lake Michigan than seems to have been indicated this morning. Thank you.

MR. RICCI: My name is Nicholas Ricci, Wisconsin Electric Power Company. With respect to what I have seen in the report, I think we can say that we support the idea of cooperative studies, certainly based on our final judgment--it would have to be based on a review of the details that will be involved-- and assuming that we will get adequate recognition for some of the studies that we are presently conducting.

MRS. LOUISE ROME: My name is Louise Rome from the Illinois League of Women Voters. In general terms I would support what Jonathan Ela has said about the content of this paper. I would like to be specific as to Point No. 2, and I am not sure whether it is Mr. Mayo or Mr. McDonald who made the statement that the comprehensive monitoring program would be financed by the utilities. That is not in the report and the prepared text. I am wondering what assurance you have if the utilities would be willing to do this kind of monitoring. The last meeting in September clearly pointed to the fact that studies in the design had not adequately been developed, and I feel that turning it over to the utilities for financing when there is research money within the bills is rather an incredible sidestepping. Can you address yourself as to how we can get more effective monitoring in view of the fact we have weaker enforcement anyway?

MR. McDONALD: You really said a mouthful. I can answer some of it. Let me answer this as forthrightly as I can.

First of all, the utilities are the ones that will be doing the discharging of this heated water into the lake. As such, under the new Act, this is nothing unique in terms of a function that the utilities or any industrial discharger has to perform. They are going to be and we think should be obligated to do such studies, however extensive they may be, over a period of time, and maybe on a continuous basis, to determine what those discharges are doing to the lake both in the vicinity of their plant plus plug-ins for totally wide assessment of what damage might be occurring. Now, I think the important thing, your point is well taken from this standpoint, there has been a good deal of reluctance by many people to accept the studies that the utilities have done in the past without assessing the merits of that contention. Starting now with the formation of this committee and getting a broad representation on that panel for assessing the types of studies that the utilities ought to do, both at their plant and lakewide, and agreeing on common assessments of how we are going to look at the results when they come in, getting the types of studies underway that really are needed in everybody's mind, and to do this requires this broad acceptance, so everytime a study is done you don't have one of the parties that feels they have been left out because this study was a result of a self-serving study. The studies are not intended to be self-serving studies. However, we feel very strongly that they like any other discharger, that the utilities have a great obligation to do these. Now, if the utilities decide they are not going to accept this obligation, I have every confidence that they will accept this obligation, if they want to get this problem resolved at an accepted speed, this is the way that we are going to move on this program. For us to think that we are going to get just another study that the parties can attack, what good is that study? This isn't the type of study that we have in mind. We have in mind a study that we hope will have maximum built-in integrity, the type of study that we require, so that we can protect the lake. I think the kneejerk reaction on this type of proposal is understandable by people such as yourself and the gentleman from the Sierra Club that got up indicating, as he indicated, after a very rapid reading of this paper, cursory knowledge of the statute, that this is a bad way to go. I think what we are trying to do here is get a good way to go and end this type of contest that we have been engaged in for so many years. I would hope that you and the Sierra Club, the interests that Mrs. Rome represents, the League of Women Voters, would get a representation on this panel so that we can sit down together and try to hammer out positions that would protect this lake. This is going to be your opportunity as I see it to sit down on these very difficult questions to try to come up with some answers because I know that things are not all black and white. I think you know that, too.

DR. CARSON: My name is Dr. James E. Carson from Argonne National Laboratory. I am a professional meteorologist. For the past year or year and one-half I have been studying the impact of cooling towers and cooling lakes on the atmospheric environment. Cooling towers which have been proposed by some people as a cure-all for thermal pollution effects in the lake do in fact create environmental problems. These can be mitigated to some extent by placing the plant at the proper place, far from major roads, major transmission lines, and major communities. However, merely placing a cooling tower on a particular plant could make a stronger negative impact than the item it was meant to cure, which is water pollution. This conclusion has been reached by several people, including those people who have studied the environmental impact of the Palisades powerplant in Michigan. This study was not done by Argonne but another national laboratory. I would suggest that the charge that has been given to the Technical Committee be very specific and state they must also investigate the impact of the alternate cooling devices such as cooling towers, cooling lakes. Only by assessing the relative magnitude of the impact of these techniques can a really good solution to the problem be developed. It is no cure to come up with a cooling tower, for example, in design that causes numerous automobile accidents in pursuit of clear water in Lake Michigan. The impact of a cooling tower at that particular plant could well be infinitely worse than the proposed once through system. Thank you.

MR. FISHER: My name is Paul Fisher, Director of Power Production, Wisconsin Power and Light Company. We operate a station on Lake Michigan, four units, approximately 500 mw. We are also 40 percent owner of the Kewaunee Nuclear Station that will be operational in late 1973. I would like to make some overall comments relative to the Environmental Protection Agency's suggestion on what is before us today. Overall, I feel that the EPA process suggestion is a step in the right direction. I am a little concerned about the assumption that all cooling water intake facilities are by fiat assumed to be inadequate and should have the best technology available. My own experience, each and every year there will be better technology available.

Also, some sort of assessment is being done by certain designers of intake facilities.

Some designers have recognized in the past, we have intake structures that are a thousand feet out in the lake. I am not quite sure that we can say all intake structures are inadequate. I feel the suggestion for an overall study of the lake is an excellent one. However, a study of the entire lake, in my judgment, cannot discriminate in the effects of the thermal pollution and the effects of municipalities. I believe there should be some sharing of costs. We ought to consider a study of the entire lake. More is involved than just utilities.

I believe it was raised in the event cooling towers would be necessary for powerplant discharges considered to be deleterious to marine life; I think it should be given adequate time to correct. It takes leadtime to design; leadtime to engineer; and leadtime to construct. If we design towers today, we cannot get them in service in less than 2 years. In any proposal of this sort, I would definitely like to see a definition of what is a closed cycle, what is the best practical technology. Unless this is spelled out -- we spent something like

$6,000,000 on a powerplant in Wisconsin where we want to avoid the effects that we are considering today. We built a cooling pond. To me a cooling pond is a closed-cycle system. Now we are asked to explain why it is not a closed-cycle system, and this is because we are taking makeup water from a source and we are sending some back. I think it is very important that any proposal like this contain specific definitions. Thank you.

MR. MAYO: Thank you.

MR. HOGLUND: My name is Barton Hoglund, Assistant Director of the Center for Environmental Studies, Argonne. I notice on page 5 a summary of the Act states, "...to conduct comprehensive studies on the effects and methods of controlling thermal discharges." There was no discussion on Dr. Carson's comments, but is it intended, is it practical to have the technical committee headed by Dr. McErlean discuss and study alternate methods in the same depth that they plan to study once through cooling, or would it be wise to have separate committees headed by men as knowledgeable and experienced in marine problems heading up

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problems with meteorological conditions, cooling towers, but study them in the same depth and same degree of concern?

MR. MAYO: What was intended here in this recommendation was to have this particular committee address itself to the adequacy of the studies that would address themselves to the issue of damage in the lake. It was not intended in any way to shortchange or to minimize the necessity of understanding other related issues. I think those issues can be addressed perhaps by a different mechanism. You are probably all familiar with the fact that related environmental issues have to be addressed in the environmental impact statements for each of the proposed installations. These environmental impact statements do get circularized, have an opportunity for a full review. That is one of the mechanisms that is available to us for purposes of looking at, examining, the related environmental impact as a consequence to alternatives to once through cooling. So there is a facility available at least to address these issues.

In the consideration of individual

permits for these discharges, it seems to me that there rests with the permit issuing agency again responsibility to address the consequences of the imposition of the requirements for controls other than once through cooling, and the permit issuing process involves a public hearing requirement that can be taken advantage of. So again there are mechanisms available to get at the issues of the consequences of the alternative methods of cooling. But for the purposes of this presentation, we zeroed in on the issue of determining damage to the lake environment because that is where the problem starts. Until we have adequately addressed those issues and can come to reasonably agreeable conclusions, we are not really prepared to face the question of should there be a requirement for alternative systems, and the related question that would flow from the statute, is it reasonable to accept something less than the best practicable control technology, but must subsequently be determined as applicable by the Administrator? That hinges on the impact of the water environment. It seems to us crucial to the whole process is our respective capability to, one, examine the impact on the water environment in the way that we agree is credible and in the way that offers us a vastly improved opportunity to agree on the results and, two, having agreed on the results, then we ought to be in a much more intelligent position to examine the need for alternative methods for cooling.

MR. HENRY: My name is James B. Henry. I am Vice President, General Counsel of American Electric Power Service Corporation. American Electric Power Company is the parent company of Indiana and Michigan Electric Company which is building the D.C. Cook nuclear powerplant on Lake Michigan. I would like to say that we fully accept the statement of Mr. McDonald that we have a responsibility to participate in studies as to the effects of thermal discharges. I am sure there may be some disagreement as we go along as to just what should be studied or what the conclusions may be, but the principle, I think, is clear. We certainly pledge our cooperation in any kind of studies that are developed in the mutual interest of the public.

I would like to make the point which

sometimes is overlooked. It is the public who pays if unnecessary installations are made, for example, cooling towers. It isn't the stockholders of the utility, and it certainly isn't the executives of the utility. It is the public. I think that we as officers of utilities and employees owe the duty to the public to participate in the development in the fullest possible way in order that judgments in these matters may be made on the basis of knowledge rather than on speculation.

MR. MAYO: Thank you.

Are there any other comments?

MR. YOCOM: My name is Thomas G. Yocom, Bureau of Sport Fisheries and Wildlife. At this point I represent myself. I think one of the things that Mr. McDonald said is very important, and this is in terms of determining what constitutes damage. I think that you have to define damage, whether it is in terms of the ecosystem or in terms of the desirable species kind of thing. Thermal plume, if you go to a thermal plume, you find that walleyes are superb. Is this something that is beneficial or is the walleye doing something at the expense of something else? We haven't really put all of the stuff together, and it is going to take something like a systems analysis to come up with any kind of predictable values. You probably have all seen the comments, we have gotten nowhere here taking all of the individual bits of information and trying to stick it together to say what the effects are. You can say the effect on whitefish is such and such. If you want to take the effect on whitefish, the effect on zooplankton, everything else, and stick it together, you may come up with recommended standards that are way below what it is for any individual species. To say, well, you guys go out and do a study, come back with some information in 270 days is ludicrous.

MR. McDONALD: It isn't that you are going to go out on Lake Michigan, this technical panel that would be set up, and do a study in 270 days. You have to have not only initial, you are going to have ongoing assessment of damage. Just because you study something for 3 years doesn't mean something couldn't happen in the fourth year. I think that is what we are talking about here today. There has to be an ongoing assessment. First we have to know what we ought to assess. The point that you make about whitefish may be abundant, is that good? Who knows? Some of these relationships we have to decide.

MR. YOCOM: It is one of the things that bothers me, the length of study. We have been involved with the Army Corps of Engineers. Do you want to collect data for us for a year, tell us what the effect is? It can't be done. To show there is no effect in 1 year does not mean there is no effect. You may be putting organisms under a stress situation. Here is an organism that has evolved to a particular nature in Lake Michigan. You put a little extra stress there. You may have to wait until the entire environment gets stressed by cold, for example, when you knock the entire population out.

MR. McDONALD: This is not a one-shot effort. It is an effort that has to be a continuous monitoring process. When you reach a certain point in the results, you have to be able to assess whether there is damage or not. Your point is well taken. This is not a 270-day study or a 1-year study.

MR. YOCOM: The thing I don't want to see happen in terms of damage is for someone to say, "Gosh, because of the thermal plume we have three populations of walleyes." If you take a look at the ecosystem from the point of view, of what man wants to get out of it--you may come up with a different kind of standard if you look at it from man's point of view than from the ecosystem point of view.

MR. McDONALD: If the Department of the Interior is represented, that will not happen. Your interests will be represented.

MR. McMASTER: My name is William McMaster, and I represent myself also. I understand that the effluent regulation will be effective in 1 year from the date of the act. I wonder why the permit should run 3 years. It would seem 1 year from date of enactment would be beneficial.

Also, the fact that the decision on the part of powerplants can be made because once EPA does permit the permit, no other agency will be able to use any sort of effluent limitations inconsistent with that. Does this leave us in a position where plants may be built or may become operational in 2 years and we will be faced with a case of requiring remedial work instead of planning ahead?

I guess I have another question. I am not sure I understand this well enough to have an opinion on it. This proposal would seem possibly to allow 3 years of operation by the plant before the environmental effects are really considered.

MR. McDONALD: Let me try to answer. Maybe the other parties may want to talk also. In terms of the 3- year permit, we said that the permit would be issued for a relatively short period of time. Three years is not a rigid figure as we indicated to Mr. Purdy. It may well be a lesser period of time. Secondly, if the effluent limitation, when it is announced by the Administrator, if it is more stringent than what the discharger had to do to satisfy the water quality standards, as we indicated in the statement the permit would in effect be terminated so that this process could go into effect. Now, let's make an assumption. Let's take a plant, X plant discharges, they apply for a permit. We write certain conditions, the

State does, into the permit conditions. We say you have to satisfy water quality standards. The permit would be issued for a certain length of time, say 2 years. Let's say a year, a year and one-half later, the Administrator comes out with his final promulgation on the effluent limitations required, and that would require, say, cooling towers. At that point the discharger would be so notified, and he would have an opportunity under a new permit process that would then start taking place, because of the termination of the original permit, he would then have the opportunity to demonstrate, if he cared to, in a public hearing which you would be able to participate in, which other interested parties would be able to participate in, that either that particular cooling tower would be required or would not be required to protect the aquatic environment in the lake. And then we would move on, on the basis of that record, and issue a new permit. So the length of time, the length of the permit is somewhat speculative right now. I don't think it is a binding thing.

There is one other factor on which Mr.

Mayo made a statement, and that is if, during the term of the permit, damage was demonstrated, it would require more stringent effluent limitations than those imposed in the original permit, The permit would also terminate and the discharger would be so notified to install the other facilities that would be required to correct that damage. Of course, this again, as Mr. Purdy wanted clarified, this would have to be on a time schedule to do these things, to do what had to be done. This is just a normal way that pollution control is handled. I know of no case where you can snap your fingers and say okay, build something that ordinarily is going to take 2 years in 2 weeks. You don't do this. When you put them on notice to do what has to be done, if they don't do it, we have very severe penalties under the Federal law which include injunctive relief to close down a facility, which include criminal penalties of $25,000 a day, $50,000 a day for repeated offenses. There are very severe penalties which all of the dischargers are subject to.

MR. MAYO: If there are no further statements, ladies and gentlemen, we will recess for lunch and we will resume at 1:00 o'clock.

(Whereupon a recess was taken until 1 p.m., November 9, 1972.)

The public session of the Lake Michigan States and the Environmental Protection Agency meeting was reconvened at 1 p.m., November 9, 1972, in the Gold Room, Pick-Congress Hotel, Chicago, Illinois, Mr. Francis T. Mayo, Regional Administrator, Region V of the Environmental Protection Agency, presiding.

MR. MAYO: It is time for us to convene again, ladies and gentlemen. To continue with the agenda, at the last session of the conference, the conferees considered and heard evidence concerning other areas of importance in preserving Lake Michigan. A package of recommendations pertaining to these other, nonthermal recommendations was given to each of the conferees for their review. The principal topics of concern involved status of compliance, phosphorus, chlorides, pesticides, selected trace metals, phthalates, PCB, and taste and odor problems in the Green Bay portion of Lake Michigan.

At the last session, there was insufficient time available to reach agreement on the final form of the recommendations. Since the last session, EPA has reviewed preliminary comments and has revised the recommendations. Today each of the States has been provided the revised version with the intention that final agreement will be reached at this meeting. Along with comments already received, certain revisions became mandatory due to the recent passage of the Federal Water Pollution Control Act Amendments of 1972. At this point, I suggest that we discuss each of the main non-thermal recommendations one at a time. I want to open discussion on the proposed recommendations for status of compliance.

Mr. McDonald.

MR. McDONALD: How do you want to handle this? Do you want to read each of the recommendations or how would you like to proceed?

MR. MAYO: Each of the members here at the head table has received the original recommendations. Subsequent to that time we had suggested revisions. Those revisions were transmitted to the other panel members. What we have before us, as I understand it, is essentially the material with those recommended changes, with some modest changes in language to fit the context of the new legislation. Now, the audience also should have available to them the same package of material. I think it might be redundant to read each one of the recommendations. I suggest that we proceed with them one at a time and just conduct our discussion on that basis. We have a number of issues to address. I think the less time we spend on redundant matters the better off we will be in keeping a reasonable schedule today.

MR. McDONALD: Well, after distributing the proposed recommendations at the last session of the conference, Mr. Purdy marked up a copy of these proposed recommendations, and as I understand it, presented it to his Commission, what he felt he could adopt. And at the same time distributed copies to the other conferees. Ralph?

MR. PURDY: It becomes more than my position now. It was placed before my Commission. My Commission commented on it, and the copy that I sent to you and to the other members of the other States represents what my Commission felt they could accept. So it is more than my position now. It is my Commission's position.

MR. McDONALD: What we did with what was sent back to us was that we made some editorial changes, deleted references to conferences, conferees, and so forth. We also reinserted certain portions that are mandatory under the, not only the past legislation but the existing legislation. I think we were in substantial agreement with what you proposed here by way of change, but it seems to me that maybe we have to go down these, Mr. Mayo, to see what we are agreeing to.

MR. MAYO: I suggest that we proceed with them one at a time.

MR. McDONALD: Okay. The Federal Government has no problem other than the editorial changes that we have presented. Maybe one of the State conferees, Mr. Purdy, might want to indicate where he cannot agree with this revised copy.

MR. PURDY: On phthalates, Recommendation No. 3, - , where it states: "The States institute a control program to reduce to a minimum level the discharge of phthalates to the environment," right at the moment these things are used in such a diverse way I am not even sure of the mechanisms by which they reach the environment. For example, it could be in rainfall or due to the fact that the plastics containing these substances are incinerated and so forth. I don't know where they reach the environment in the largest quantities. Secondly, as I remembered Dr. Mount's testimony, one, the Food and Drug Administration did not seem to be particularly concerned about the level found in food products. They are not concerned about this being a threat to the health of people. And then the other one somewhat different from the written testimony, as I understood Dr. Mount, he was not too concerned about the toxicity of this to fish and aquatic organisms. You know this is somewhat different than the technical committee report. As I remember it, we questioned Dr. Mount on that particular subject, and he did not seem to be real concerned. If there is no real concern, I am wondering what the rush is to institute a control program before we even know that they need to be controlled.

MR. McDONALD: Mr. Bryson, do you have an answer to that?

MR. BRYSON: Let me ask a couple of questions first. In your report on the monitoring program, where the industries have to tell what products they are using and so on, would that later be covered in that reporting program?

MR. PURDY: Yes. It is one of the items that we have identified that they must report on, and through this we have estimated that some 60,000 pounds a year may be lost to the environment in Michigan. But at the moment, you know, okay, so there is 60,000 pounds lost, what is the effect?

MR. BRYSON: If I remember the testimony, it was along the lines that there are indications that these do cause a problem or can build up to levels where they do cause a problem. If I recollect, he suggested doing what we can to start instituting controls now so that we do not end up with a PCB problem sometime in the future. I think the thought is to see what we can do in terms of controlling the discharge of these. Maybe the first step at this point is getting a handle on how much is being used in each State, and then as we get a better handle on the toxicity, as shown in No. 2, that we are better able to institute a control program at that point, if you look at the control in the broadest sense here.

MR. PURDY: We are concerned with where they are being used. We are concerned about the mechanism in which they reach the aquatic environment, and monitoring to establish this path, but we don't know that we ought to stop the discharge at this point in time.

MR. FETTEROLF: Recommendation No. 3 is so broad it covers all phthalates. Phthalates are made up of many different esters. So far, the bioassay toxicity work has really only identified one or two esters as being biologically harmful. Certainly we should be concerned about the control of the particular esters which are harmful. I am not certain that a blanket restriction is warranted. I noticed in the report covering phthalates and PCB's presented at the September meeting that there really was not a recommendation made by the technical committee on control. It was more a gathering of information and expression of concern without really being sure that control measures were necessary. Could I read that?

MR. McDONALD: Why don't you read that.

MR. FETTEROLF: It is in the last paragraph. "Based primarily upon chronicity bioassay, the committee feels it is necessary to reaffirm our initial concern with environmental phthalate contamination and to recommend to the conferees that comprehensive State surveillance of municipal sewage treatment plants, industries, domestic water intakes and fish be initiated to determine phthalate trends in the aquatic environment."

MR. BRYSON: Let me ask the other States, do you have a feel for what quantity of phthalates are being discharged to the streams and into Lake Michigan? Mr. Williams, will there be a handle on phthalates?

MR. WILLIAMS: We will be including phthalates in our monitoring program. In general, I think we concur in the Michigan recommendation here, that greater emphasis be placed on the surveillance and on the monitoring program, with controls instituted as these obviously become necessary. I would make one suggestion with respect to the surveillance program that is recommended for the States. Although I am certain that we could and will if necessary involve ourselves in the evaluation of accumulation of phthalates in fish, it strikes me in conjunction with another recommendation, as I recall in pesticides or the

PCB recommedations, that it speaks rather specifically about the various sport fisheries and EPA coordinating the fish analysis. I think here is an opportunity for us to avoid duplication of effort. I think we might strike the fish from the State surveillance program and concentrate this where I think the samples are being collected. They may as well be analyzed for phthalate contributions there as well and avoid duplication of effort.

MR. BRYSON: Mr. Hert?

MR. HERT: My comment on this, still with Item 1, asking for a progress report, I suppose this may be a typographical error, you want a report by December 31, 1973, and not 1972?

MR. BRYSON: You are correct. No, wait a minute. A progress report should be submitted by the end of the year to see what program has been instituted and so on in each of the States.

MR. HERT: The program to be instituted by March 1973, it seems to me untimely to submit a progress report 2 months before you institute a program.

MR. BRYSON: I don't believe so because I think certain things have to be set in motion now in order to be ready to go in March. What we are after here is to see if something additional doesn't have to be done prior to the March date so that things will be ready to go.

Let me get back to the question that I asked Mr. Williams. Do you have a handle on the quantity of phthalates in the basin? That is the same question that I asked before.

MR. HERT: We do not have a handle on it. We are instituting plant-by-plant analyses for phthalates. We are not in a position to make a progress report at the end of next month.

MR. FETTEROLF: I can say for the biologists in Michigan and for the Commission that we are very concerned about phthalates, but we do not feel that an emergency program of control is called for because of the assurance FDA has given us that they are not concerned over human toxicity, cumulative toxicity, and therefore we feel that this is one of the pollutants that there is time with; that we can make a logical assessment of the problem without any harsh restrictions at the beginning.

MR. MAYO: How about the issue of toxicity of fish and aquatic life, do you have a sense of urgency there?

MR. FETTEROLF: The Bureau of Sports Fisheries at Columbia, Missouri, has been the prime Federal facility looking into this. As stated in the technical committee report, they feel in general that the phthalate esters have relatively low toxicity to aquatic life with the exception of Daphnia, and I have been in touch with Schoettger and Stallings at Columbia, and they really cannot pinpoint a definite problem that we should have a great deal of concern over at this time considering the existing concentrations in our streams.

MR. PURDY: If I might comment on the progress report, I had not interpreted that as meaning a progress report on the results of the monitoring program. It was a progress report on the action the State had taken to develop a monitoring program.

MR. BRYSON: To see what sort of program is going on, where it is headed.

MR. PURDY: Yes.

MR. BLASER: Well, we have been running a monitoring program on this with a combination of

Federal and State moneys. One observation I have is that, although the suggestion is that we commence a monitoring program by March 1973, with our money, we cannot. We will have to wait until July 1st, the beginning of a new fiscal year, and new appropriations. In discussing with the head of our division of laboratories, he feels that with the combination of new equipment, new staff and training, he said he would need 8 months roughly to commence a good program, an accurate program, 8 months after the assurance that we would get Federal funding. I know those dates are not pleasing to hear. He said once the Federal funding is made available, the equipment has to be ordered, delivered, people found, people trained, to get the accuracy of results needed.

MR. BRYSON: Federal funding under the State or local grant?

MR. BLASER: Regardless of how it comes. Built into our current fiscal budget we have only a very low level of such testing, and some of that testing we farm out. A comprehensive program I would assume would mean a drastic expansion. We are roughly doing about 20 samples a month, 220 a year.

MR. MAYO: Do you think it would be sufficient to take Item 3 and change it to read somewhat like the following: The States institute compatible surveillance programs to identify the level of phthalates discharged to the environment.

MR. BRYSON: Can I add a phrase?

MR. MAYO: Have some identification of what it is we are dealing with in terms of amount of material and the principal locations in which they are found.

MR. BRYSON: I would like to capture the language that Mr. Williams used, which is along the lines,"As toxicity data become available, the States should institute the necessary control programs." Repeating the statement,"As toxicity data become available, the States should institute the necessary control program."

Concerning the question of -- I don't believe the Department of Interior representatives are here. I don't see them now.

Mr. Bartman, can you provide us a little background on what level of work the Department of the Interior is doing on level of phthalates in fish in Lake Michigan?

MR. BARTMAN: I regret to report I cannot. I can get these details for you in very short order. I am not familiar with the details of the program. Our program is primarily a research program on phthalates rather than the overall monitoring program, I believe.

MR. MAYO: Is there anything more on phthalates? In order to perhaps proceed in a more orderly way, I suggest that we start with the items on the agenda, work with the items on the agenda one at a time. We can express our concurrence as we go along. Is there any comment on the status of compliance?

MR. WILLIAMS: I think on the first page under Combined Sewers, we use the word "negligible." I am sure in Green Bay and other cities they take considerable offense at the use of that term. I recognize perhaps in total within the basin that negligible may be appropriate. I think we could substitute "inadequate," "unsatisfactory," something that would be somewhat less offensive to those who have done an outstanding job.

MR. MAYO: Perhaps we can say "with notable exception."

MR. McDONALD: Such as Green Bay.

MR. WILLIAMS: I believe "unsatisfactory" probably expresses it equally well.

MR. BRYSON: "Progress in meeting this requirement basinwide has been unsatisfactory."

MR. MAYO: Is there any other comment on the status of compliance item?

MR. WILLIAMS: I have a question on page 2, Recommendation No. 2. I am not certain that it would really relate to the other clearly enough here. If you are behind, you should be given a high priority in the issuance of a discharge permit.

MR. McDONALD: I think from a Federal standpoint, getting a discharge permit--let's say you are a major discharger -- is going to start the clock running on the enforcement program. Until such time as the Federal permit is issued, the discharger in effect under the new statute has a pass. Federal enforcement action is not going to be initiated, it says, until final administrative disposition of it. No action will be taken from an enforcement standpoint until December 31, 1974. We would like to do everything we can to accelerate that process. That is the intent of that.

MR. WILLIAMS: Does this further imply, for example, where EPA has had a 180-day action which has been satisfied through agreement--and there have been a few of these throughout Wisconsin--that this in essence constitutes, until the terms of that agreement have expired, the basis for the discharge? In other words, there is as far as the Federal agency is concerned an agreement here which might possibly be further strengthened through a discharge permit, but at least it establishes the base?

MR. McDONALD: Yes, I think so.

MR. WILLIAMS: I would have two suggestions on page 3 of this recommendation relating back to the dates contained in Recommendation No. 3. Where we have talked about April 1, 1973, and then December 31, 1973, it would appear to me that just as the comment was made earlier by Mr. Hert, I believe, that we are asking for a report before we have the information so to speak. The date of September 1, 1973, for preparing a ranking would appear to be ahead of the game. We are asking the States to require of their municipalities a report by December 31, 1973, in other words, a year from now. It would seem more appropriate that perhaps February 1 or March 1, 1974, that this ranking be issued based on an evaluation rather than doing it 3 months in advance of the receipt of the reports. It would appear more logical, if you are making your determination before you get the information, why did you ask for the information?

MR. McDONALD: In doing this there is an assumption the State already has some sort of a handle on the magnitude of its problems and tries to place a ranking on these.

MR. WILLIAMS: I am certain that we can give you a ranking pretty much today about the severity of problems in Wisconsin. But I think in terms of a meaningful report that the information that would be gleaned by the December 31, 1973, date would have some bearing on this and would in fact be able to give to EPA and to the other States a much more meaningful analysis of the problem, and perhaps the anticipated solutions to the problem.

MR. McDONALD: That language, I think -- didn't you put that in, Mr. Purdy? Didn't you review that?

MR. PURDY: Yes. I found that the States could identify fairly soon the type of sewer system that the various municipalities had, either separate or combined sewer system. And from the standpoint of surveillance programs, and where such overflows created problems, a previous condition where the stream did not meet the water quality standards that have been adopted, if we can rank those in some order of priority on the basis of present information, and the studies in themselves required by the municipality would show the specific area within the municipality that is served by the combined sewer system, it would spell out the engineering solution to the problem and give you a cost estimate on that engineering solution. The study to be required of a municipality was separate from that required of the State in the earlier one.

MR. WILLIAMS: If I might pursue it a bit further, the question of dates aside, the word "priority" crops up here. I am wondering if this relates -- perhaps Mr. Mayo would have some insight into this -- if this relates to the new clean water law and the funding that is indicated in there for the correction of sewer problems. We are talking in the new law about not only financing treatment systems but the replacement of sewers. Is this intended to assist EPA in the development of that type of concept as to where the funds would be applied first?

MR. MAYO: The new Act as I recall, in the planning and construction portions, still requires the identification of priorities for eligible projects. With the extension of the eligibility to include storm and combined sewers and collection systems in addition to treatment plants, we are going to be looking for this kind of information anyway. The sooner we get at it the better prepared we are going to be to make use of it.

You may recall in the statute it requires that the EPA conduct a needs assessment every 2 years, and will present a report to Congress every 2 years in the odd numbered years on the magnitude of the needs that are to be met in the grants processed. Now, the first odd numbered year to come up is 1973. That report is supposed to be submitted to the Congress, I think, in February, either January or February of each odd-numbered year. We are having a difficult time trying to meet that requirement for 1973. I think the sooner we get at making these kinds of appraisals the sooner we are going to get the jump on the process of meeting that needs inventory and making the necessary adjustment in State allocations.

MR. WILLIAMS: I think my interest in the date has a bearing on whether we are looking on this report as a matter of additional information, which I think then makes sense to follow the communities' reports to the State. If we are looking at a study as opposed to a practical schedule that may relate to the grant program, I would say if it does relate to the grant program the date should not only be September 1973 but sooner than that.

MR. PURDY: When I went through this particular section I was looking at it as the establishment of priority needs for the treatment of combined sewage only and not as the priorities for that particular problem that might relate to sewage treatment plant construction. At this point in time I don't feel that we are in a position to second guess what the construction grant program requirements might be as they relate to collecting sewers, combined sewers, sewage separation and sewage treatment plants. When we talk about these needs, we had under our grant statute received new applications on the 15th of September of each year. September 15, 1971, those applications totalled up for projects costing 800 some odd million dollars. On September 15, 1972, when we took new applications, this matter of combined sewers, overflow treatment, storm sewer separation, eligibility of collecting sewers, the fact that Congress was considering that, that appeared in many of our applications, and the grant for the construction value that we have now on hand in the way of grant applications went from 1 year of 800 some odd million dollars to this year of one billion 800 some odd million dollars.

MR. McDONALD: Does that include combined sewers?

MR. PURDY: It includes in some cases combined sewer overflow treatment measures. There are some people that you know, it leaked out from Congress that storm sewer separation was being considered. Some of them included that. We have one project which was $4,000,000 alone in collecting sewers in grant applications. We have enough grant applications on hand today to take all the money that Michigan would receive during the 3 years authorized by the new clean water act if it were totally funded. And I say if it were totally funded. I make that a big "if," and I just see continuing frustration in this matter of building those things that we have stated are necessary by statute in the context of the construction grant program.

MR. McDONALD: What is the dollar figure of combined sewers and overflow in Michigan?

MR. PURDY: It hasn't really been separated. We have not been able to go through the applications and separate it out. We have attempted in the last few weeks to make an assessment of our needs, and considering storm sewer treatment, collecting sewers, and so forth, and we feel now to meet the requirements of the new clean water bill that we are talking in excess of $3,000,000,000 worth of construction prior to 1980. But this is just priorities for combined sewer overflows as comparing one project to another, and not comparing that with sewage treatment plant treatment at all.

MR. WILLIAMS: I have no objection to the date as stated. We recognized the basis on which the date was selected. I assumed that this was a sort of an arbitrary date. There is no objection to it.

MR. MAYO: Is there any other comment on the status of compliance?

MR. FETTEROLF: Yes, Mr. Chairman, Mr. Hert wishes to ask you about No. 4. He has a question. He is coming back into the room now.

MR. WILLIAMS: Since I do seem to have a concern with dates, I suggest February 15 or some date other than January 1 as the report date for that.

MR. MAYO: Mr. Hert, do you have a question about Item No. 4 on page 3?

MR. HERT: Yes. The question is I don't recognize it from earlier communications. I wonder where it cropped up from and what it refers to.

MR. McDONALD: This was one of your State delegates redrafting this. Mr. Purdy is the one that redrafted this. We found it acceptable.

MR. PURDY: Well, some of the people that testified at the last conference expressed concern that not all of the industrial dischargers that should be listed and are being reported to the conferees were receiving the proper attention. I just took the new congressional language of nonpublic waste discharges to identify those industrial waste dischargers. As far as I am concerned we have presented the information on our total discharges to this conference, and we are ready to again reassess this, let you evaluate our assessment of it, determine that we are reporting on those that should be reported on.

MR. HERT: We are talking about industrial source, not point source?

MR. McDONALD: Industrial. I think also BPI raised that point at the last session. We had a man contact each of the State agencies to see if there were any revisions due in the major discharger list for permits. I understand that cooperatively this was worked out, some changes were made. So now we feel we have all of the major dischargers that contributed to the pollution problems on an agreed-upon major discharger list which is again subject to change if it is indicated that somebody ought to be added or deleted. We have pretty well covered the front on this with the statement that Mr. Purdy suggested that really buttons it down all of the way.

MR. HERT: I agree then to that, but I would support Wisconsin in asking for at least a month's delay in that report.

MR. McDONALD: How about February 15?

MR. HERT: All right.

MR. DUMELLE: I wonder, Mr. Mayo, if we can have a little clarification on what is meant by adverse impact on the water quality. The problem is that you could have a discharge which is diluted by a stream, but at its mouth it is something different. As you go further from the mouth of the stream, that will be diluted down to the water quality of Lake Michigan because of the amount of the bulk waters. It seems to me this is too general a term. Everybody has his own idea of what is an adverse impact. If it is a persistent sort of a thing, it can stay there forever and not be removed by some biological degradation. It seems to me you come back eventually to the pound loading that goes to Lake Michigan, get back to the inventory problem. I don't know whether the Federal EPA is going to develop this as a tool for the States to use to judge their, whatever it is, iron inputs, chloride inputs, and so on, in terms of the entire mass balance through the lake. It seems to me that is a very important tool we ought to have, knowing what comes in from all of the streams and what comes in from the rainfall. The data I have seen are fragmentary. I know how difficult it is to achieve this thing.

MR. MAYO: This language suggests that the evaluation should identify both the quality and quantity of the waste discharged. If the inventory is that complete, then the assessment of whether or not there is an adverse impact should be made on the part of everybody.

MR. DUMELLE: This would be the beginning of the inventory, each of the States would put this out, total it, and judge it on those terms?

MR. MAYO: Yes.

MR. PURDY: I don't agree it is the beginning. It has been there from the very beginning. It is in the records now. If a person wants to dig through the records, that information is there. It has been part of the reports of all of the conferees in all of the past conferences.

MR. MAYO: Is there any further discussion on the status of compliance?

The next item is chlorides.

MR. McDONALD: I did not see much difference at all in this recommendation, Mr. Mayo. It seems to be in substantial agreement with what we have down here.

MR. MAYO: Is there any comment on the chlorides recommendation?

Phosphorus.

MR. HERT: I have a slight problem with Item No. 1, "Facilities of less than 2500 population equivalent would be exempt from the requirement." I believe it requires some communities less than 2500 to provide 80 percent phosphorus removal, and I think it should be clear that we are talking about facilities should be exempt from the additional rather than the basic requirement of 80 percent.

MR. BRYSON: You are suggesting --

MR. HERT: Adding additional, exempt from the additional requirement.

MR. DUMELLE: I have a question on No. 1 too. Why is it necessary to come up with a cost estimate on this additional treatment facility since it is going to be required anyway for all of the dischargers? Was there some feeling if the cost is excessive they will take another look and perhaps go back to the 80 percent? What is the reason for doing that?

MR. McDONALD: I think at the last session Mr. Purdy in particular raised a comment on how much this is going to cost in terms of sludge disposal and so forth, so it could be plugged into the recommendation. We looked at it from that standpoint. Also he added because of the possible problems with construction grant levels of funding, he didn't know if he could come up with a rational time schedule for doing what had to be done. Is that right?

MR. PURDY: This is true. Someplace along the line I think we need to analyze where we are going to accomplish the most with what I view will be scarce dollars for municipal construction, and without having this cost information I don't know how we can make that analysis. I think we need to know what we are going to accomplish by a dollar spent on going from 80 to 90 percent removal versus the dollar spent on combined sewer overflow. I don't see all of the dollars that we need in the next few years flowing into all of these problems. You are going to have to be selective. We will have to make sure that we did the most for our money spent. Among other things, I think the new Act requires in many instances where you go to certain levels of treatment, something different than may be best available, that one has to give consideration to the added-on cost versus the benefits, and so I think this is in line with the requirements of the clean water act.

MR. McDONALD: How does this compare with the U. S. - Canadian agreement? Is it inconsistent?

MR. MAYO: It is not grossly inconsistent. The only thing that would be lacking here would be the target date that is recited in the U. S. - Canadian agreement, 1975 for the boundary waters. I haven't seen the gross inconsistency between this and the language in the Canadian group.

MR. McDONALD: Except this is open-ended.

MR. PURDY: With respect to that date, we may meet it and we may not. I think it is time that we start telling our audience that we will not meet it when we can assess it and realistically appraise the fact that we are not going to make it in view of the other requirements that are placed upon municipalities and the resources to move in that direction. It is easy to say that a waste treatment requirement for a public source, the correction of that problem is not dependent on what is received in State and Federal grants. From the real live world, it may not be dependant upon it, but it sure is a lot easier if they do. If they don't receive it, it will be a long hard struggle through the courts to require it to be done. I am not sure it is going to be required even then. I just think that we need to get these things out in the open and no longer say that something is going to be done in 1975, and then wait until 1975 and say we cannot meet it.

MR. McDONALD: I cannot disagree with that logic. I think again that is disturbing. Here the Congress has set brand new deadlines of 1977, for example, for best practicable control technology for industrial and municipal waste, and a State that has all of the applications, such as you have, $1.3 billion, already utilizing the full funding available from the Federal Government, you won't have anything left to do these things anyway even if you made the listing. Is that your point?

MR. PURDY: That is right.

MR. DUMELLE: Mr. Purdy, do you have a cost benefit analysis that you use on your projects? If you do, what is your rule of thumb, if you have one, for justifying additional treatment?

MR. PURDY: The cost/benefit does not come into play in our priority scheme. The cost/benefit must be considered in the interim basin plans required under the Federal regulations as it relates, say, regional facilities of one plant, two plants, or what. There is no set cost/benefit ratio that I know of.

MR. BRYSON: Recently I saw copies of a letter that you sent that showed cost per capita for phosphorus removal. In each of the letters that I saw, you said the cost is $3.25 per capita, is not excessive, therefore you are ordered to go ahead. Do you have some fixed figure in mind where it becomes excessive in the Commission's eyes?

MR. PURDY: Well, the Commission reviewed the cost of providing interim facilities for a number of plants, along with the cost that had been incurred by municipalities that have moved ahead with grant programs and some that have moved ahead in the absence of grant programs. That figure of something less than $4 per capita seemed to fit into the pattern of those that we are moving ahead at the present time. By requiring these additional ones to move in that direction, we were not asking them to do anything more than some others in the State. Now, the Commission did not fix a fixed dollar as to where that breakpoint would be because we assumed, if we fixed that, someone would try to get above it.

MR. HERT: Mr. Mayo, I think a part of the thing that we are talking about here is not the initial phosphorus reduction. The point is that you cannot get the 1 mg/l objective without the extensive plant enlargement. Even plants that have adequate capacity have to provide additional settling capacity to get rid of the phosphorus.

MR. MAYO: That is essentially the point Mr. Purdy raised.

MR. HERT: Yes.

MR. WILLIAMS: I would suggest, Mr. Mayo, language "as soon as possible" for the preparation of reports is rather vague. You are familiar, of course, because of the clean water law, with the X number of reporting dates that your Agency now has, and certainly the document we are dealing with here talks about several report dates for the States. Since the experience, the actual online experience with phosphorus control is that most of the States' reports are going to be obtained after December 31, 1972, I would suggest at least 1 year for that evaluation and study, perhaps making January 1974 or December 31, 1973, a choice as a target date for that evaluation.

I think, again, to give you a meaningful report we will have to rely on the experience and the results that we are obtaining from plants that go on line within the next several weeks.

MR. McDONALD: What about "...as soon as possible but no later than December 31, 1973"?

MR. MAYO: Are there any other comments on the phosphorus issue?

MR. DUMELLE: On page 2, Item 3, I realize you are talking about phosphorus, but I don't know where to put it. Number 3, page 2, I think after the phrase "nutrient inputs," I would like to see a phrase something like this, "or other limiting elements," and the reason I say that is because we did have some evidence in the phosphorus committee that there would be something else which would limit algae and no one quite knows what that element is or what quantities are going into the lake. I am still worried that perhaps we may not be able to control the eutrophication of Lake Michigan with the phosphorus inputs. We will have another string in our bow. If the other limiting element is something like cobalt, vanadium, selenium, that perhaps comes in from one or two sources in the basin, then we may want to be looking at that sort of control. I suggest that as a research item there. That will not just constitute phosphorus, look at the next limiting element and see if that needs control also.

MR. MAYO: Any objection? Are there any other comments?

Let's move on to pesticides.

MR. WILLIAMS: We have no problem with pesticides, but you might strike "it is recommended that."

MR. MAYO: The second sentence in Item 1 does not read complete.

MR. BRYSON: EPA will coordinate with them. It might be an awkward sentence. Nothing is left out.

MR. MAYO: The rest of it says "and will report to the States," and so forth.

MR. BRYSON: "On the basis of the monitoring findings by the Bureau of Sport Fisheries and Wildlife, EPA will report on what program is in operation."

MR. MAYO: Reporting what program is in operation may not mean a lot. It is the results of the findings that would be submitted.

MR. BRYSON: "Shall report to the States on July 1 of each year the results of the monitoring program."

MR. MAYO: Period.

MR. PURDY: On Item No. 2, I just hope that you recognize that the States, in attempting to secure the passage of this type of legislation that is recommended here, may run into the same difficulties that took place at the Federal level this last year --that a pesticide bill was passed by Congress; Congress had an opportunity to do this on a national level and didn't; and that we may run into the same sort of problems in the States.

MR. MAYO: Due process will be served.

Is there anything else on pesticides? The next item is polychlorinated biphenyls.

MR. WILLIAMS: I seem to have a hangup on dates here. The date of June 30, 1973, is suggested for the progress report. Conferring with our laboratory people, they recommend October 1, 1973, on the basis that our water quality sampling and analysis program is run through the summer months primarily, and that an October 1st reporting date is much more feasible for them. They would have precious little to report by June 30.

MR. MAYO: Any objection?

MR. McDONALD: October 1st?

MR. MAYO: October 1st or the end of October.

MR. WILLIAMS: October 1st they thought they would have a meaningful report.

MR. FETTEROLF: Mr. Chairman, Recommendation No. 2, "Upon identification of any source of PCB in the basin, the State within which the source is located shall take immediate steps to eliminate, or if this is not practicable, to reduce each such discharge to an absolute minimum." The industries which have the greatest losses of PCB's will have to substitute other compounds to do the job that PCB's are doing. I cannot think of the name right now of one of the substitutes, but I believe they are phosphate esters or something like this. It is a very unknown quantity as to what environmental effects it will have. I think that if the States are to agree to this recommendation that there ought to be a companion recommendation that the EPA place emphasis on evaluating and approving of substitutes for the PCB's. Ralph just said they have no authority to approve them. But I think we are getting into a situation which will be comparable with the detergents. When the detergent industry spent millions of dollars gearing up to go to NTA, then it was decided NTA was an inappropriate substitute. I think some emphasis should be placed on evaluation of the substitute which will be used for PCB.

MR. BRYSON: Are you saying it is on the national level it should be done?

MR. FETTEROLF: I think Michigan has already urged this at the national level. I would think since Region V and the Lake Michigan Enforcement Conference has now taken the hardest enforcement line on the PCB's, they ought to assume some responsibility for making very sure that the substitute is going to be environmentally benign.

MR. McDONALD: That is a good suggestion. I think Mr. Bryson has a comment on how we can accomplish that.

MR. BRYSON: One of the recommendations that you will be coming to shortly, the Toxic Substances Committee, the last series of recommendations, deals with setting up a committee to look at those types of questions in the Lake Michigan Basin headed by Dr. Mount. Such efforts that you are describing would come under Dr. Mount's mission with his laboratory in Duluth. That might be the proper place to include that charge. Dr. Mount's laboratory is the principal arm of the Environmental Protection Agency that looks into that type of substitute chemical.

MR. FETTEROLF: If I am not mistaken, that committee is scheduled to meet in the very near future. Is that correct?

A VOICE: I don't know.

MR. FETTEROLF: It would seem that would certainly be a charge to them to get hot on this right away.

MR. BRYSON: I would agree.

MR. WILLIAMS: In light of the change of the report date, is Recommendation No. 3 really necessary? Do you have something else in mind?

MR. PURDY: Number 3 is somewhat along a similar line of what we are doing in the matter of DDT, and that is to say what our control efforts are accomplishing. This, again, will see what our control efforts accomplish.

MR. WILLIAMS: It could be incorporated in the October report?

MR. PURDY: Yes.

MR. WILLIAMS: I have no objection to it from the standpoint of the document. It struck me as being a restatement of what we had said.

MR. MAYO: Are there any further comments on the PCB issue?

We have discussed phthalates.

MR. WILLIAMS: Could we get a restatement of what the phthalates recommendation is now? I know that Dale has changed some language. I am not certain how it reads.

MR. McDONALD: Item No. 3, deleting the item written and substituting, "As toxicity data becomes available, the States should institute the necessary control programs."

MR. WILLIAMS: How do you anticipate that this language squares with the new permit program?

MR. McDONALD: There is a specific section under the new Act, Section 307, dealing with toxicity and pretreatment. That deals fairly specifically on a statutory basis of what has to be done by the administration, the month and year ahead on this particular problem, identifying the list of toxic substances, coming out with standards that would have to be followed to control the toxic substances. This is plugged in very well. In effect, it doesn't really mean too much even putting this in. It would be advisory in terms of the legislation. It puts it out front that as soon as we do know more about it, what we ought to do. I think it will be controlled somewhat automatically once Section 307 runs its course by plugging this into the permit process.

MR. BRYSON: I think it gives us a handle to open it back up under the permit program. We may not be specifying all of the levels that we need in some of these permits. This triggers one that we ought to be aware of.

MR. McDONALD: This is a good point. This identification of the actual levels probably is going to be subject to some debate, public hearings, comment, until we shake down what the actual numbers ought to be on toxicity of a particular substance.

MR. WILLIAMS: Before we leave the subject, I did raise the question earlier about the matter of evaluation of accumulation of fish. I again would restate that as a request, that that be incorporated, and in fact in a restatement of these recommendations that our Department drafted, we did attempt to tie it in in the area of the recommendations. We can do fish analysis and do it for mercury and other things. It is not the analysis that troubles us, it is the collection. Collection, if it is being done for one purpose, just simplifies the procedure, if you don't duplicate.

MR. MAYO: Do you have some specific language that you want to suggest?

MR. WILLIAMS: I cannot recall whether it was pesticides where we talked earlier about the responsibility for monitoring.

MR. FETTEROLF: That would rest with the Bureau of Sports Fisheries and Wildlife. Mr. Williams, I thought earlier when you were mentioning this you were hopeful that you might bring the Food and Drug Administration in on this inasmuch as they would be sampling certain fish for this.

MR. BRYSON: That is in No. 4.

MR. FETTEROLF: The programs that the United States Sports Fisheries and Wildlife run to determine trends of pesticides in Lake Michigan fish, and the programs that the Food and Drug Administration and our Department of Agriculture run to determine whether guideline levels are being exceeded, are aimed one way, on the fish that are being consumed by humans. Or in the case of the Bureau of Sport Fisheries, they are selecting certain species of fish in which they can take certain small samples and with a minimum effort determine trends. When you are concerned with something such as phthalates, an environmental contaminant, you want to be going in and sampling different fish in the food chain, different fish in the environment that might not have any use as human food. I think you would be requesting these other agencies to take on quite an extra burden. Unless you were equipped to finance this investigation, I think they would be very reluctant to do it unless you could trade some other service off with them. It seems for our specific purposes we are going to be looking in Podunk Creek below a discharge that we are suspicious of having a large amount of phthalates in it, and I don't think the Bureau of Fisheries and Wildlife are going to be interested. Maybe we ought to leave it open. If we could work out a cooperative agreement it would be desirable. I am afraid the individual State will have to assume the responsibility here.

MR. BRYSON: Mr. Williams, do you have some substitute language or did Carlos put that in the rest of his comment?

MR. WILLIAMS: As you do this type of work, would it be appropriate for EPA to assume that function? I believe you are in fish collection and analytical business.

MR. BRYSON: Not along the lines you are thinking of. EPA does not have a program where they are on the Great Lakes analyzing them. That does fall in the Bureau of Sports Fisheries and Wildlife.

MR. WILLIAMS: If it is the consensus of the other States they want to undertake the fish sampling, I am sure that we can gear up to do it.

MR. MAYO: Can we move to the selected trace metals?

MR. BLASER: Mr. Chairman, may I inquire about the testing of fish, toxicity and such, is there a mechanism by which the total task is divided up among the States, or is there, does each one go independently and have a duplication of each other's work, gaps, and so on? Who does the coordination, if any?

MR. BRYSON: Fish in the lake or streams?

MR. BLASER: Take the last, toxicity. I am sure that it relates to the stream. Who does this? Who coordinates all of the fishery testing to make sure there is not duplication and gaps in the whole project? You have 50 States working on it, plus the Federal Government. It would seem there would be some coordinating mechanism necessary.

MR. MAYO: You are talking to Item 1?

MR. BLASER: Item 1

MR. BRYSON: Generally within EPA this is set aside for certain laboratories to go into this aspect. Dr. Mount's laboratory is one of the prime laboratories in EPA. There are certain areas in the research and development program to get close communication between the States, between the Federal agencies. EPA has a fairly extensive program of asking people what are the research needs, what type parameters should EPA be looking at in their research program.

In answer to your question, I think there are mechanisms available to prevent the duplication of research. Whether these are always used, who can say?

MR. BLASER: If this is the recommendation of the conference, who would be expected to lead them? Would you in effect take the lead to communicate with the State or are we expected to do it or how?

MR. BRYSON: What this is saying, the State agency should take a look at its research program. If there are some areas where ~~it~~ thinks work needs doing that it doesn't know about, or it feels somebody is doing, it should be contacting the appropriate parties to see if it is being done. That in this case is EPA. It is a matter of both looking at what is going on, both determining their needs, and then starting some discussion. The mechanisms are there for the discussion. They have been there for some time. It is a matter of getting hold of those.

MR. BLASER: I know it is a bit tedious. I have seen so often a program start out with good intentions and then fall down because of lack of coordination. I am going to assume -- the Illinois Natural History survey does such testing. I am going to assume that this decision, the outline of the testing to be done will be initiated and coordinated by the United States Environmental Protection Agency, passing the assignment down to the Illinois Natural History survey. I, myself, will alert them that it is coming, but I assume that is the best channel, is it not?

MR. BRYSON: I would prefer to see you contact the appropriate State agency saying we have a recommendation on selected trace metals. Are there some research program needs that we have? Let's communicate them to the Environmental Protection Agency, get in touch with the Administrator to see that your thoughts are ground into future budgetary efforts of Dr. Mount, and so on.

MR. BLASER: I guess I am skeptical it will work well on that basis. Someone has to set out the total project, what metals to be tested for, what fish to be tested, parcel them out. I will be glad to pass that on to the Illinois Natural History survey. My experience tells me this is likely to have awkward gaps. I think the United States Environmental Protection Agency should take the test.

MR. BRYSON: You have certain needs within Illinois in terms of toxicants. These may not necessarily match the needs Mr. Purdy has; hence the recommendation establishing priorities on these needs. Dr. Mount and the Environmental Protection Agency do not have an unlimited budget to look at all toxicants. They have to come up with some mechanism for rating these because the Lake Michigan States, 10 or 12 other States say we want you to look at this. I think what does come out of this, EPA gets a number of inputs on who wants what toxicants looked at. We can take a certain slice of those. Again the communication goes back, that is it. We have looked at the priorities all the States have submitted, plus other people; we can do these. The others will have to be put off. We suggest that you do them or we will add them at some point in the future.

MR. FETTEROLF: Mr. Blaser, I think if you will notice one of the requirements is that these bioassays be done with Lake Michigan water. This will mean getting a tank truck to take water to the Illinois Natural History survey. In evaluating the recommendation, it seems to me the Environmental Protection Agency should contract this to some laboratory which has Lake Michigan water available to it. Secondarily, some committee will have to lay down the ground rules on how the bioassays are done because the wording is "acute toxicity," and the objective in securing acute toxicity information is so that it is applicable to a longterm chronic toxicity. Someone has to decide in the case of the Lake Michigan organism how that toxicity is run so we can determine the safe level of these toxicants in Lake Michigan. It ought to be on the agenda of the next meeting of this Toxicity Committee.

MR. BRYSON: Put your mind at ease. I will be in touch with Dr. Mount immediately to make sure that will work. You can expect a letter from him.

MR. BLASER: Thank you.

MR. DUMELLE: Mr. Mayo, I have a comment on Point No. 2 if we are ready for that. It leads off by talking about the States determining the input of metals to the basin but the remainder of the language seems to indicate purely a measurement of the aquatic discharges, and I would suggest that we perhaps pin the responsibility for determining the metal content of rainfall. I would suggest that it be put with the Federal Environmental Protection Agency. The Phosphorus Committee's testimony, for example, showed --Fred Lee, for example, feels a million pounds of phosphorus goes into the lake from rainfall. Another witness from the State Water Survey put it at 50,000 pounds a year. The methods are not the same. That is an important figure. Mr. Copeland in an article showed the buildup of selenium in decreasing concentrations as you get away from Chicago and attributed it to the fossil fuel plant fallout. We have heard about mercury coming from fossil plant fallout. It might be better to have the Federal Environmental Protection Agency taking the responsibility for coordinating with the States or being a lead agency on that particular aspect of it to make sure it is not forgotten.

MR. MAYO: Maybe this is another one of those items, Mr. Dumelle, to be put in the research category in terms of development of capability to do that. I don't know that we have a capability at the present time to even adequately estimate what the fallout might be of these metals as a consequence of rainfall or as a consequence of natural draft of particulate matter, power plant emission. If we are going down that road, very likely we ought to take the step of identifying the research needs, seeing what we can do to develop a technology that will permit us to make estimates on a credible basis.

MR. DUMELLE: I have no objection. It should be covered in some fashion, whatever the best fashion is.

MR. MAYO: We will develop some language and include that as Item No. 4. Is that acceptable? Do you have some specific language there?

MR. DUMELLE: I just wrote this out,"EPA shall initiate a program and determine input from rainfall."

MR. MAYO: Let's put it in the context of identifying research needs and see what we can do.

MR. DUMELLE: Fine.

MR. BRYSON: "The Environmental Protection Agency shall coordinate the program to identify research needs, to assess inputs into Lake Michigan of any selected trace metals from rainfall."

MR. MAYO: Is that acceptable?

Are there any comments on taste and odor problems and the associated recommendations?

MR. WILLIAMS: I have an editorial comment. The words should say "...water which is drawn or taken from Lake Michigan." Beyond that, I am pleased to see that the focus, research emphasis is on the problems in the Green Bay area. I think it is important to point out that one of the most significant taste and odor problems we have in Wisconsin is in the city of Green Bay. It draws its water through a pipeline arrangement from Lake Michigan well down the coastline from any presumed influence from Green Bay proper. I am not certain whether the vicinity of Green Bay is perhaps too restricted. The concerns here are really broader than that, although fortunately to date they have been in perhaps from Sheboygan north.

MR. BRYSON: If I remember the report prepared by Michigan and also the Environmental Protection Agency at the September session, the prevalence of taste and odor problems occurred when there were northeast winds that were pushing the current down the shore. I think the EPA and Michigan felt the most likely culprit would be the Green Bay vicinity. I think that is broad enough that it allows some flexibility. I would hate to tackle taste and odor problems in Lake Michigan.

MR. WILLIAMS: We have some report from Manitowoc, Two Rivers. The critical report we have had is from Green Bay which takes water from near Two Rivers.

MR. McDONALD: Which is out of Green Bay.

MR. WILLIAMS: I don't know of any communities actually taking water out of the Bay per se. Manitowoc and Menominee. I guess.

MR. FETTEROLF: Marinette takes water from Green Bay.

MR. McDONALD: Why don't we do it geographically, in the vicintiy of the Green Bay peninsula? Okay?

MR. WILLIAMS: In the sense that it focuses attention and research in that area, we are very pleased by that.

MR. McDONALD: Strike Green Bay, call it the Door Peninsula, Door County.

MR. MAYO: Are there any further comments on the taste and odor problems?

MR. BRYSON: Make sure that it does not limit Michigan too much. Are you going to get in trouble trying to research in Wisconsin waters?

MR. FETTEROLF: We were just discussing that. We don't think the language will stop us at all. We have an ongoing program that extends into Wisconsin waters, up to the northern tip of Green Bay. The taste and odor problems are in the northern tip of Green Bay as well as in the southern tip of Green Bay.

MR. McDONALD: Furthermore, Mr. Bryson, I am surprised you asked that question. If this language was offensive to Michigan, you would have heard. You wouldn't have to bring that up unilaterally. (Laughter). I think somebody ought to enter an objection on general principles.

MR. MAYO: How about the Toxic Substances

Committee, the recommendation for an activity?

MR. PURDY: Mr. Chairman, following the latter part of that statement, starting with, "The committee will develop semiannual reports commencing July 1, 1973, wherein the committee's progress, findings, needs, recommended control programs, and necessary implementing actions are discussed," I really don't think that the charge to this committee ought to include those necessary implementing actions. Further down, "The chairman of the committee will advise the administrators as to appropriate regulatory followup on suggested control programs." In both cases, I don't think that ought to be his function. I think the first sentence ought to delete the "necessary implementing actions," and then that sentence next to the last sentence would be deleted in its entirety. I believe the type of regulatory followup that is necessary should be developed by others, not necessarily that committee. Outside of that, no problem.

MR. MAYO: Any further comments?

MR. McDONALD: I have one comment. With all the corrections that we have on this, Mr. Clinton

Braddock has been getting a master copy here which will be put together and distributed to each of the conferees. You have the master copy of the corrected version of the recommendation, Mr. Braddock. You will put them together and see that we get them to each of the conferees in the next couple of days, and that will be the final version of the recommendation. If anyone in attendance would like a copy also of the final version, sign your name or tell Mrs. Janet Mason in the rear of the room that you would like a copy and we will see that you get a copy mailed to you personally. If you don't want to do that, give us a call at the office and we will see that you get one in the mail.

MR. PURDY: Just in case somebody wasn't here when Mr. Mayo gave his opening statement, or at least we forgot, these recommendations that you are talking about are now in a different context than recommendations issued by prior gatherings?

MR. BRYSON: That is correct. That is why everything was so blessed.

MR. MAYO: Are there any further comments on the material that we have gone over?

MR. BRYSON: Yes. The keeper of the master copy and I are in disagreement on what we decided on Toxic Substances Committee. Mr. Purdy, which language did you want stricken, where we are talking about necessary committee actions?

MR. MAYO: The words following "recommended control programs."

MR. BRYSON: Strike the words "and necessary implementing actions are discussed."

MR. MAYO: Then the other deletion was the next to the last sentence.

If there are no other comments on the part of the State or Federal representatives at the head table, as we indicated this morning we are available to take the time to hear comments from those of you in the audience who have been staying with us this afternoon, and it is now 5 minutes until 3. I would suggest that we take time on the comments to the extent that you wish, to make them until about 3:30 p.m., and we then adjourn.

MRS. LOUISE ROME: In your presentation this morning on thermal, you had a recommendation for a technical panel on monitoring in thermal situations to include "members of the environmental and other citizen groups." The League of Women Voters, the League has a recommendation and wishes to get it on the books here now. It is in this letter. We consider we have a highly qualified person to serve. I have a copy for Mr. Blaser since she is an Illinois person. The sooner you start, the happier we will be.

MR. MAYO: Would you like to read the letter?

MRS. ROME: We are recommending one of our members who is qualified as a biologist to serve on our behalf on this committee, and I think unless you accept it there is no point in putting the name in the record. (Discussion off the record)

MR. MAYO: Are there any other statements? Please give your name and your affiliation if you have one.

MR. BONNER: My name is Hal Bonner. Regarding the list of dischargers submitted to the enforcement office earlier last month, as I understand it Mr. Purdy had indicated he was going to discuss the entrance of these into the list of dischargers.

I understand also Mr. McDonald has compiled a new list of dischargers. I am curious as to the status now of the Enforcement Division on these dischargers.

The second point I would like to make is in regard to taste and odor problems. Mr. Richard Vaughn, formerly as I understand it of the city of Chicago, the water supply department, has repeatedly before this enforcement conference indicated that there are increasing costs in activated carbon usage at Chicago water filtration plants due to the necessity of removing elements which cause taste and odor. However, the city of Chicago and Illinois are not included in the section or the study committee regarding taste and odor. We would recommend they be so included.

MR. McDONALD: Do you want to stay there? Maybe we can answer some of these questions from the Federal standpoint. The list of names of industries that Mr. Komi of BPI entered the last time were entered in the record and distributed to the conferees. Also as I indicated, the names of these companies, some couple of dozen, 30 or 40, whatever the number was, were reviewed by the head of our permit program in EPA with the individual State agencies to indicate whether additional names of dischargers ought to be added on the major discharger list. I have a brief statement here that I would like to enter into the record dated November 3 on this subject. I would like to read this. That will be the most economical way.

"At the Lake Michigan Enforcement Conference here in September, I was asked to review the subject report, coordinate with the States and determine whether those dichargers identified in the BPI report not on the EPA State permit program major discharger list should be in. All but 23 of the dischargers identified in the report were already included on the major discharger list. I have discussed the report with the following State representatives, Mr. Carl Blomgren, Illinois; Oliver Williams, Wisconsin; Francis B. Frost, Michigan. We have jointly agreed that only those dischargers identified in Category 1 in the attached list should be added to the EPA State permit program major discharger list at this time. Dischargers identified in

Category 12 of the attached list of State-approved treatment facilities either are already constructed or nearing completion or have a lesser impact on the water than the major dischargers already identified."

On list one, Category 1, dischargers that should be added to the major list, admittedly there is a subjective way of doing business, whether they should be added or not, whether they are added or not they are subject to permit application. It is a question of how much sooner they will get processed. They all will be processed. They all will be subject to the process. These are added to it: Illinois, Allied Chemical Corporation, Industrial Chemical Division, Chicago. In Michigan, the Du-Well Metal Products, Inc., Bangor, Michigan, and the Mead Corporation, Paperboard Products Division at Seco, Michigan. In Wisconsin we would add the Anaconda American Brass Company at Kenosha; Niagara, Wisconsin Paper Company at Niagara, Wisconsin; Wisconsin Power and Light Company, the Pulliam Plant; and the Wisconsin Power and Light Company, Edgewater Plant. That is seven. The other 17 that were not on the major discharger list were by our judgment as the regulatory agent thought not to be as of high priority as the others. These will be taken care of in due course. I would invite any evidence or anything further that you feel should be evaluated, we will consider that in due course, if you want to come to the office and have further discussion. My own feeling at this point is as far as worrying about whether they are going to be taken care of or not, under this new permit program, the question of dischargers, discharging into the Lake Michigan Basin, all will be taken care of. In the inception of this enforcement conference, first in 1965, later in 1968, when extended to include the whole basin there was a very limited jurisdiction. There was no permit program. Now since the last session of the conference we have an industrial and new municipal permit program. So I think we could beat this to death. I think the point is, though, that nobody is trying to keep anybody from doing what they have to do, and they are going to have to do it. That is where we stand.

I think on the other question, on this recommendation on assessing the impact on Lake

Michigan, I think we did discuss that. The quality and quantity of wastes will be assessed. It will be taken care of. There isn't any question of this with regard to the Federal EPA.

With reference to taste and odor, we did not think at the last conference in the terms of setting up a special research project in the Chicago area. As I understand it, the way we have attacked the problem here, the Chicago area serves a water supply to some millions of people. The question of attacking the sources of taste and odor is an ongoing program that again under the permit program would be intensified. Also if I remember Mr. Vaughn's last testimony, I thought the use of activated carbon was going down in the city of Chicago. As I recall, he reported the same at the session in March of 1971, that it was going down. I stand subject to correction on this. I cannot remember. Dale Bryson thinks I am right. If Dale says it is right, it must be right. But in any event, this program--Chicago was singled out by the very presence of Mr. Vaughn at the conference--must be monitored very carefully.

I think again this is ongoing although very very important; it is not a special or peculiar problem. In the Green Bay area, they don't know where it is coming from. We have an excellent idea in Chicago where it is coming from. We are attacking that source.

MR. BONNER: Thank you very much. We will certainly be looking with great interest for your letter and be prepared to come in shortly.

MR. PURDY: From the standpoint of the list being identical, there is no way two lists serving different purposes can be alike in any degree. This is what I was trying to explain. Some people fail to recognize the very limited jurisdiction of the enforcement conference. In one case those industries listed in that, it made no difference whether they are minor or major dischargers. It had no relationship to the enforcement conference. The enforcement conference dealt with those things identified as a problem of interstate interest. The list that we are talking about now as being major dischargers represents something for an entirely different purpose, and there is no way that the two of them will ever jibe. The first list, Congress gave us a new water law, so we don't have to worry about that.

MR. McDONALD: The question is, it is a matter of concern to the extent that I think they felt there was some perhaps attempt on behalf of the conference to not include those industries that ought to be included. I think it is very clear that no attempt has been made as far as we are concerned, and no attempt will be made. Even if an attempt were made by the permit process that we now have, everybody is covered, has to do the same thing.

MR. PURDY: Again I want to point out, if a person wants to take the time and go through the many volumes of records of these past enforcement conferences, at various times the several States involved have presented full information on all of the industrial dischargers within the State, including many more than have been on the list that has been prepared by various people and the quantity and the quality of those discharges have been disclosed to all conference members.

MR. McDONALD: When we get volumes and volumes of testimony, a lot of this conference business becomes quite sophisticated -- why we don't have something in the conference, why it was out of the conference. This becomes a pretty intricate business at times. So this extended comment on where we stand I hope clears up the record. There is no attempt to keep anything out of the conference if it rightly belongs in it. If it doesn't, we will pick it up some other place.

MR. MAYO: Are there any other comments?

MR. ROY PORTERS: My name is Roy Porters. I work with the Lake Michigan Federation. I would like to ask Mr. McDonald one question. We have had a very thorough discussion of how to control waste from point sources. Would you care to comment on some of your plans for controlling waste from nonpoint sources?

MR. McDONALD: Again that is a question -- as we get closer, and identify how to control point sources -- it is a question that is going to be of increasing concern. There is really at the present time in the Federal establishment no good amount of effort being spent on controlling nonpoint sources of pollution. We are taking and have been using over the years--we see this for the immediate future also--a concerted effort to get those sources that we can most quickly get under control. This is true in the States also. If you can get large quantities of waste under control because it is a point source, goes out of a particular pipe versus land runoff from various sources, obviously you are going to try to pursue that first. At the same time, as the point sources come into control, the significance of the nonpoint sources comes into increasing importance in magnitude. In the new statute, it will start addressing this problem not only in a general way but a more specific way with men and resources that will be made available, that will really start coming to grips with this problem. If we get all the point sources under control in the next dozen years or so, and you still have a significant pollution problem, that doesn't make too much sense. That is what the legislation is going to correct in the years ahead. By no means is the point source versus nonpoint source attack in balance at this point. A lot more has to be done on nonpoint source control of pollution.

MR. MAYO: One of the key recommendations that was contained in the recent United States - Canadian agreement is a reference agreed to by the two governments to study the relationship between land runoff and water quality in the Great Lakes. Now, the International Joint Commission is in the process of designating very soon a working group to follow up on that reference. That work group will be expected to develop a plan of study I think sometime between now and the end of January. The Environmental Protection Agency has in its budget for Region V for this fiscal year, I believe it is $200,000 to get started on that study effort, to develop information on the relationship of water quality to land drainage in the Great Lakes. Some things are in process to help us establish what those relationships are, and having established them, to again then develop some programs for corrective action.

MR. MAYO: Are there any other comments?

MR. McDONALD: I would like to make one comment before you close. I think that the end of an era in water pollution control is occurring at the termination of this meeting today. In 1965-- I hear some cheering from some of the States -- but the first Federal entry into the water pollution picture here in the Chicago area was in the Calumet Enforcement Conference called in 1965. I remember when that conference opened, to show you how the cast of characters has changed, possibly nobody, with the possible exception of Ralph Purdy and perhaps Oral Hert, was a principal participant in the discussions that took place at that initial conference in 1965 over at McCormick Place. I remember very clearly when that conference opened it was before a jampacked audience of 500 or 600 people looking for great expectations about what would happen in pollution control in this area. Part of the job has been done. There is a lot more to do. I notice the paucity of attendance here today. It looks like maybe we have come pretty much full cycle on the pollution problems that everybody has been considering for a number of years. I see hard core followers. As I look around, I don't see all of the hard core that used to follow these conferences. We are going into a whole new stage with the enforcement conference going out of business, to go more specifically to the point source pollution in an attempt to pin down the polluters point by point as opposed to this conference technique which in many cases had broad general areas. But we think a very redeeming feature will be lost in many respects, being able to get together and discuss problems that beg for solution on a basinwide basis. Getting them to have the opportunity to sit down publicly and do this technique, unless someone takes the initiative to approach these things on a basinwide basis, this technique is going to be lost. It has been a very valuable thing, I think.

MR. MAYO: Do any of you gentlemen wish to make a comment?

MR. HERT: I think very often it is noted that these conferences show the things that haven't been done yet. If you look back through the record of what has been done since 1965 to reduce the amount of pollutants that are discharged in the Lake Michigan Basin, you will see there has been tremendous progress made. Even though this may be the end of the conference proceedings, much of the direction that has come from the conference is continuing within the States, and I am sure with the permit program that some of the loose ends will be tied up that we have yet to do.

MR. MAYO: Are there any other comments, gentlemen? If not, we will stand adjourned.

(Whereupon, at 3:15 p.m. the meeting was adjourned.)

REBUTTAL COMMENTS BY D. W. PRITCHARD
ON M. A. SHIRAZI'S REVIEW OF THE
ANALYSIS OF THE SINKING PLUME PHENOMENA

1. Mr. Shirazi's treatment of the winter sinking plume is unfortunately a case of the apparent application of numerical principle without considering the basic physics of the phenomena. Mr. Shirazi has apparently heard that proper scaling of a process from model to prototype requires the use of non-dimensional ratios. What Mr. Shirazi did not do was to examine the physics of the process being considered in order to determine which of a large number of possible non-dimensional ratios are appropriate for scaling of the sinking plume phenomena. His approach as contained in the EPA document of October 11, 1972 clearly violates basic physical principles.

2. Before proceeding with the question of the appropriate non-dimensional ratio to use in this case, I would like to restate some basic facts about the winter sinking plume phenomena.

(a) Water has its maximum density at 4° C (39.2° F). The density decreases as the temperature decreases from 39.2° F to 32° F (the freezing point) and also decreases as the temperature increases above 39.2° F.

(b) In the absence of horizontal motion, a column of water which is denser than the surrounding water will sink and spread along the bottom, regardless of how small the density difference is between the column and the surrounding water.

(c) Thus, for the February observations of the Waukegan plume, when the ambient temperature of the surrounding water was 33° F, the thermal plume would have sunk when its temperature had been reduced to just slightly less than 45.6° F if the plume had not had excess horizontal momentum, since the density of the thermal plume would be the same as the density of the surrounding water at that temperature. Likewise, for the March observations of the Waukegan plume, when the ambient temperature of the surrounding water was 32.5° F, the plume would have sunk when its temperature had been reduced to just slightly less than 46.0° F if the plume had not had excess horizontal momentum.

(d) The fact that the plume did not sink in February until its temperature had been reduced to 37° F indicates that the excess horizontal momentum of the plume delayed the initiation of a sinking plume through an interval in which the density of the plume was greater than that of the surrounding water, and actually through the point of maximum density (39.2° F). The same comment can be made about the March observations at Waukegan.

(e) Thus the greater the excess horizontal momentum of the thermal plume at the point at which the density of the plume just becomes equal to the density of the surrounding water, the greater will be the additional dilution required before a sinking plume will develop.

3. It is true that I used a somewhat simplified approach to scaling the sinking thermal plume observations from Waukegan to Zion, though the primary physical principles applicable to this phenomena were included. My approach as reported to the Four State Enforcement Conference on Lake Michigan was to equate the point of sinking of the thermal plume with the point at which the excess momentum of the plume had been reduced to some critical value. This approach is conservative; i.e., gives a higher temperature of sinking for the Zion plume than does the more rigorous approach outlined below.

4. The physically appropriate non-dimensional ratio for scaling the sinking plume phenomena is the ratio of the horizontal inertial forces to the buoyant forces; i.e., the local densimetric Froude number of the thermal plume. This ratio is given by:

$$\mathbb{F} = \frac{u}{\sqrt{g h \, |\Delta\rho/\rho|}}$$

For the February measurements, when the ambient temperature was 33° F, and the plume temperature at sinking was 37° F, the local densimetric Froude number of the plume at sinking was 3.49. For the March measurements, when the ambient temperature was 32.5° F and the plume temperature at sinking was 39° F, the local densimetric Froude number at sinking was 5.00.

Solving the above equation for $\left|\Delta\rho/\rho\right|$, and putting in the appropriate values of the known parameters for the February Waukegan observations, gives

$$\left|\Delta\rho/\rho\right|_{s.p.} = 1.71 \times 10^{-4} u^2$$

But, using the similarity relationship

$$u/u_o = \theta/\theta_o$$

we have for the density difference ratio at the point of the sinking plume for Zion

$$\left|\Delta\rho/\rho\right|_{s.p.} = 3.69 \times 10^{-5} \theta^2 = 3.69 \times 10^{-5} (T_h - 33)^2$$

From tables of density of water as a function of temperature, values of the actual ratio $\left|\Delta\rho/\rho\right|_{act}$ can be determined for given values of T_h when T_a = 33° F. The sinking plume will occur at the temperature at which $\left|\Delta\rho/\rho\right|_{s.p.}$ equals $\left|\Delta\rho/\rho\right|_{act}$. The following table gives the results of such a comparison for the Zion case based on the February sinking plume observations at Waukegan.

T_h °F	$\lvert\Delta\rho/\rho\rvert_{s.p}$	$\lvert\Delta\rho/\rho\rvert_{act}$	$\lvert\Delta\rho/\rho\rvert_{act} / \lvert\Delta\rho/\rho\rvert_{s.p.}$
40	18.08×10^{-4}	0.98×10^{-4}	0.054
39	13.28×10^{-4}	1.00×10^{-4}	0.075
38	9.22×10^{-4}	0.97×10^{-4}	0.105
37	5.90×10^{-4}	0.86×10^{-4}	0.145
36	3.32×10^{-4}	0.75×10^{-4}	0.225
35	1.48×10^{-4}	0.54×10^{-4}	0.365
34	0.37×10^{-4}	0.32×10^{-4}	0.865
33.5	0.092×10^{-4}	0.16×10^{-4}	1.739

The last column of the table is the ratio of the actual $\lvert\Delta\rho/\rho\rvert$ to the value computed from the sinking plume similarity equation. Note that this ratio departs significantly from unity for all temperatures except the interval between 34° F and 33.5° F. The interpolated value of the temperature at which the Zion thermal plume would sink for ambient conditions corresponding to the February 1972 Waukegan observations is 33.9° F, or at an excess temperature compared to ambient of only 0.9° F.

A similar calculation for the March 1972 observations gives a temperature for the Zion sinking plume of 34.3° F, or an excess temperature compared to Zion of only 1.8° F.

5. Thus, it is clear that the less rigorous approach I used for the testimony I gave previously resulted in overly

conservative (i.e., high) temperatures for the sinking plume to be expected at Zion.

D. W. Pritchard
Consultant
5 November 1972

B-1

ENVIRONMENTAL PROTECTION AGENCY

October 25, 1972

Mr. William L. Blaser, Director
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, Illinois 62706

Dear Mr. Blaser:

The attached review of testimony at the Lake Michigan Enforcement Conference by the EPA National Thermal Pollution Research Program is enclosed for your information.

Sincerely yours,
ORIGINAL SIGNED BY DALE S. BRYSON

Dale S. Bryson, Chief
Enforcement Branch

Attachment

IDENTICAL LETTERS TO:

D. Currie
R. Purdy
T. Frangos
O. Hert

cc: F. Rainwater - ltr. only
Bryon Lee w/ltr & attachments

B-1-a

ENVIRONMENTAL PROTECTION AGENCY
Pacific NW Environmental Research Lab, NERC-Corvallis

REPLY TO ATTN OF: Research Sanitary Engineer
National Thermal Pollution Research Program

DATE: October 11, 1972

SUBJECT: Reviews of Presentations to the September 21, 1972, Session of the Lake Michigan Enforcement Conference

TO: Dale S. Bryson, Deputy Director
Enforcement Division
Region V

As requested by your memorandum of September 25, 1972, members of the National Thermal Pollution Research Program staff have reviewed three of the subject presentations:

Presentation by	Reviewed by
O.D. Butler	B. A. Tichenor
D.W. Pritchard	M. A. Shirazi
G.F. Lee	G. R. Nelson

The following comments are submitted for inclusion into the record of the Conference and for possible presentation to the upcoming Conference session on thermal discharges.

Statement of O.D. Butler

Mr. Butler's statement contains essentially the same information and data as his previous statement of November 5, 1970, presented to the Illinois Pollution Control Board. Review comments on that statement were prepared by Tichenor and Shirazi and transmitted to Region V via memorandum of January 15, 1971. In addition, that memorandum was entered into the record of the March 23-25, 1971, session of the Lake Michigan Enforcement Conference. I believe that the comments presented in our January 15, 1971, memorandum are still valid and pertinent, and a copy of the memorandum is enclosed. In support of and in addition to our memorandum, the following comments on Mr. Butler's September 21, 1972, statement are provided:

1. The cost estimates for dry towers (Exhibit A) are of little interest, since the backfitting of Zion with dry towers has, to my knowledge, never been considered a reasonable alternative.

2. As pointed out by Mr. Butler on page 2, our original September, 1970, data were based on the optimal design of cooling systems for new plants. Thus, his comparison of backfitting cost data with our September, 1970, data is unreasonable.

3. Mr. Butler's contention on page 4 that capability losses at Zion should be made up by the cost of the Zion plant ($207/KW) is reasonable, when base loading this extra capacity is planned, but he

EPA Form 1320-6 (11-71)

fails to account for the increased revenues which would result from this increased capacity during the majority of the annual cycle when capability losses will not occur. If this added capacity will indeed be base loaded (as stated by Mr. Butler on page 4), then the additional revenue resulting from the increased base load capability of Zion must be included in the cost estimate (see page 3 of our January 15, 1971, memorandum). Mr. Butler did not consider this factor, and thus his cost estimate for capability loss is high by at least a factor of two.

4. Mr. Butler contends on page 4 that his cost estimates have "... been confirmed by estimates and actual experiences of other utilities which are in the process of trying to backfit stations on Lake Michigan." Two problems arise from this statement:

a. To my knowledge, there is no "actual experience" for backfitted power plants on Lake Michigan. Only the Palisades Plant is committed to backfitting, but their new cooling system is not yet completed.

b. Cost estimates on backfitting from other power companies do not "confirm" Mr. Butler's estimates for Zion. Relevant cost data contained in the Argonne report "Summary of Recent Technical Information Concerning Thermal Discharges Into Lake Michigan" (pages 102-109) contain a wide range of cost estimates. The following table summarizes a portion of this information and compares it to Mr. Butler's data:

Backfitting (Mechanical Draft Towers) Cost Data (Argonne)

Plant	Cost Increase* ($/KW)	Increased Busbar* Cost (Mills/KWH)
Pulliam	28	0.80
Kewaunee	45	0.95
Point Beach	43	1.15
Waukegan	18	0.56
State Line	39	1.10
D. C. Cook	40	1.15
Zion (Butler) (Exhibit B)	56	1.63

Note that Mr. Butler's estimate exceeds the others both in terms of capital cost ($/KW) and increased busbar cost (Mills/KWH). In fact, Mr. Butler's estimates for Zion are two and three times higher than similar estimates for the Pulliam and Waukegan plants, respectively.

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*Computed (if necessary) assuming a capacity factor of 72 percent and an annual fixed charge rate of 18 percent in order to make the estimates comparable to Mr. Butler's data. (The 18 percent fixed charge rate, and thus the increase in busbar cost, is higher than normal.)

5. I object to the statement on page 4 where Mr. Butler says that Tichenor "...has increased his original estimate from 0.2 Mills/KWH to 0.6 Mills/KWH." Mr. Butler is confusing our original optimal cost data with data on backfitting cost which I presented at the State hearings in Michigan, Wisconsin, and Indiana. I have not increased my estimates, but I have presented data indicating that backfitting costs can be three times higher than the costs for optimally designed cooling systems. It is also interesting to note that Mr. Butler's estimates are based on a capacity factor of 72 percent and an annual fixed charge rate of 18 percent; while our data assume values of 82 percent and 14 percent respectively. Thus taking Mr. Butler's capital cost data (which I believe to be excessive for the reasons discussed above) and applying our values for capacity factor and fixed charge rate, we find the Mr. Butler's increased busbar cost of 1.63 Mills/KWH is reduced to a value of 1.13 Mills/KWH. Also, subtracting the approximately $20 million capitalized cost of the gain in revenue from the increased capacity (see page 3 of January 15, 1971, memorandum), the increase in busbar cost is further reduced to 0.95 Mills/KWH. Thus, if the comparisons between EPA estimates of backfitting costs and Mr. Butler's data are made with similar assumptions, the differences between the two estimates is reduced considerably. To paraphrase Mr. Butler (page 5), I am pleased to see that his comparisons can be made more realistic when uniform criteria are applied.

6. Finally, I noted with interest Mr. Butler's final comment (page 6) that his data are "...based on real costs to a real plant." This is inconsistent with his statement on page 2 where he emphasizes that his "...cost estimates are still design estimates" and that "...it is difficult to know the cost of building a one of a kind item until the project is completed." Thus, Mr. Butler's data are estimates in the truest sense of the word and not "real costs."

In summary, Mr. Butler presents cost estimates for the Zion plant which, in my opinion, are high both in terms of capital cost and increased busbar cost. Comparison with other cost estimates for backfitting fails to validate Mr. Butler's estimates. The use of uniform economic critieria to compare costs shows that Mr. Butler's cost estimates, while high, are not as divergent from other estimates as they first appear. Finally, the effect on consumer cost is not discussed and even using Mr. Butler's capital cost data, I feel that the consumer's cost would be increased by no more than 4 percent and would probably be less.

Statement by D. W. Pritchard

The following comments are related to the second portion (pages 7-12) of Dr. Pritchard's presentation, "Concerning the Winter Sinking Plume."

The sinking plume phenomenon in a surface jet adds a new complication to an already mathematically difficult problem. We agree with Dr. Pritchard that theory is inadequate at the present time to predict the onset of sinking for surface jets.

In the absence of adequate analysis, one must resort to conjectures and if, as in this case, some field data are available, maximum use of such data must be made. Care should be exercised to make appropriate use of the data for the application to other sites. Unlike generalized mathematical analyses, field data represent the unique situation under which they were obtained and extrapolation to other sites will be valid only with careful scaling.

Dr. Pritchard has used the field data on sinking plumes resulting from the Waukegan plant discharge to predict the same phenomenon for the Zion plant discharge. In the following section, we will reproduce his analysis and show that under reasonable assumptions agreement is obtained with some of his findings but divergent conclusions are reached as a consequence of his apparent change in strategy. Details are not spelled out and results are given too abruptly in the last paragraph (p. 11) of his September, 1972, statement to enable further scrutiny.

A computer program developed at MIT (Ref) for surface discharge was run at a typical low Froude number. We found that at some distance from the source, the excess plume temperature and velocity decay similarly. We shall use this observation in the scaling process, and we shall see below that this assumption produces agreement with Dr. Pritchard's analysis of the Waukegan data.

1. Analysis of Waukegan Data

a. February measurements

Initial excess plume temperature, $\Delta T_o = 17° F$

Ambient temperature at location of observed sinking plume, $T_a = 33° F$

Sinking plume temperature at above location, $T = 37° F$

Excess sinking plume temperature, $\Delta T = 4° F$

Dimensionless excess temperature ratio at which sinking plume was observed, $\frac{\Delta T}{\Delta T} = \frac{4}{17} = 0.235$

Initial excess plume velocity, $u_o = \Delta u_o = 3$ ft/sec

Excess horizontal velocity of the sinking plume =
$\Delta u = 0.235 \times 3 = 0.71$ ft/sec
(agreement with Dr. Pritchard)

(Note that $\frac{\Delta u}{\Delta u_o} = \frac{\Delta T}{\Delta T_o}$ by assumption)

b. March measurements

Dimensionless excess temperature ratio at which sinking was observed $\frac{\Delta T}{\Delta T_o} = \frac{39-32.5}{16.5} = 0.394$

Excess plume velocity, $\Delta u = 0.394 \times 3 = 1.18$ ft/sec (agreement with Dr. Pritchard)

2. Scaling Procedure

Excess temperature and velocity ratios are functions of plume characteristics which are determined by local and upstream forces exerted on the plume. We assume that field data, while accounting for all these factors, exhibit their total influence in the dimensionless excess temperature and velocity ratios and cannot be characterized by the absolute magnitudes of temperature and velocity as implied in Dr. Pritchard's analyses. Based on this assumption, we continue to apply Waukegan's data to Zion.

3. Application to Zion Discharge

Initial excess temperature, $\Delta T_o = 20°$ F

Initial velocity, $u_o = \Delta u_o = 9.3$ ft/sec

a. Sinking plume under February conditions:

Temperature of sinking plume, $\Delta T = 0.235 \times 20 = 4.7°$

Horizontal velocity of sinking plume, $\Delta u = 0.235 \times 9.3 = 2.19$ ft/sec

b. Sinking plume under March conditions:

Temperature of sinking plume, $\Delta T = 0.394 \times 20 = 7.9°$ F

Velocity of sinking plume, $\Delta u = 0.394 \times 9.3 = 3.66$ ft/sec

We conclude, therefore, that the Zion plume sinks at a higher temperature than the Waukegan plume, both under March and February conditions. The excess temperatures of 4.7°F and 7.9°F have been predicted based on Waukegan data. These contradict Dr. Pritchard's 3°F maximum excess temperature of the sinking plume predicted under February conditions. We believe that the reason for this discrepancy is the use of 1.2 ft/sec absolute excess velocity as a universal scaling parameter in contrast to our use of dimensionless velocity ratios.

Statement by G. F. Lee

Dr. Lee's presentation attempts to show that the blowdown from cooling towers at the Zion Plant would be unacceptable from the standpoint of water quality degradation. While Dr. Lee presents information in an attempt to support this contention, we do not believe that his conclusions are justified. The following comments are provided on specific points within Dr. Lee's paper:

1. The statement uses a drift level of 0.1 percent of the total circulation rate (page 3). This is very excessive. The state-of-the art provides for drift levels of 0.002 percent and 0.005 percent from natural and mechanical draft cooling towers, respectively.

2. Throughout Dr. Lee's comments he compares the chemical concentration of cooling tower blowdown with the lake standards. It should be pointed out that a chemical concentration in the blowdown can exceed the lake standard and still be well below the effluent standard.

3. The discussion on the influence of ammonia is misleading (page 9). The study on which the statement is based is (1) undocumented and (2) may not allow for process leakage, which is not a problem in power plant cooling towers.

4. The effects of chemicals added to the lake due to water treatment will be minimal:

a. Chlorine (page 11) - power plant operations and math modeling indicate chlorine feed for biological control in cooling towers will have less impact on the receiving stream than once-through cooling. The reference to chlorine feed at Zion is unfounded since the plant will use mechanical condenser cleaning (Amertap) for fouling control.

b. Corrosion/scale treatments (page 10, 12-17) - modern power plants are designing out corrosion via alloy heat exchangers, concrete distribution lines, epoxy coated return lines, etc. Also corrosion and scaling are less of a problem than in the process industries, due to (1) steady-state operation, (2) low skin temperature, (3) high velocities and (4) low delta T's. The net result is the almost complete elimination of conventional treatment chemicals. The only chemical added in significant quantities is sulfuric acid for pH adjustment.

c. Phosphate contribution (page 14-15) - phosphorus will come from boiler blowdown - this will be present even with once-through cooling. For reasons cited in paragraph 4b, the phosphate issue in power plant cooling towers will be nil in a vast majority of the cases. Where deposit control chemicals containing phosphates are used, they will be of the organo phosphorus types. These chemicals contribute 80-95 percent less P when compared with phosphate. This is due to lower feed rates and chemical structure. Other alternatives such as non-phosphate anti-scaling agents can be applied.

d. Evaporative effects - Dr. Lee's comments on the increased concentration of innate chemicals of the lake water due to evaporation in the cooling towers must be taken in perspective. From the Department of Interior report Feasibility of Alternative Means of Cooling for Thermal Plants Near Lake Michigan, it can be shown that the evaporation rate due to once-through cooling would be approximately 80 percent of the evaporation rate of cooling towers. This implies that on a lake wide basis, the concentration effects due to evaporation from once-through vs wet cooling towers would closely approximate each other.

In summary, the general characteristics of cooling tower operation from the present state-of-the-art of the process industries cannot be used to predict the impact of cooling tower blowdown from future power plants. The basic reason is that the conditions for cooling water in the electric utility industry are unique. Power plants do not have the high skin temperatures, high temperature drops, and low flows of the petroleum/chemical industry, from which a great deal of information has been taken; nor do they have the complex distribution systems, the process leaks, the shell side cooling, the hybrid metallic surfaces, or the uncontrolled discharges of other industrial plants. Power plant cooling towers operating on Lake Michigan will not increase the total amount of chemicals in the lake, with the possible exception of sulfate due to pH control. This contradicts Dr. Lee's tone throughout his statement, which he summarizes on page 17-20.

A great majority of problems associated with blowdown control from power plant cooling towers have been approached and solved. The remaining problems have solutions through the intelligent application of technology and economics.

I trust the above comments will be useful to you. Please contact us if further questions arise.

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Reference

Stolzenbach, K. D. and D. R. F. Harleman, "An Analytical and Experimental Investigation of Surface Discharges of Heated Water," Dept. of Civil Eng., MIT, Report No.16130DJU 02/71, EPA, Water Pollution Control Research Series, U.S.GPO

Enclosure (1)

MAY [illegible] EDITION
GSA GEN. REG. NO. 27

C-1

UNITED STATES GOVERNMENT

Memorandum

TO : Director, Office of Enforcement and Cooperative Programs, Great Lakes Region, EPA, WQO

DATE: January 15, 1971

THRU : Chief, National Thermal Pollution Research Program

FROM : Chief, Hydrographic Branch and Chief, Controls Branch, National Thermal Pollution Research Program

SUBJECT: Costs of Backfitting at Zion Nuclear Power Plant

As requested by your memorandum of November 25, 1970, we have evaluated the comments and data which Mr. O. D. Butler of Commonwealth Edison presented to the November 5, 1970 meeting of the Illinois Pollution Control Board. In addition, Mr. Butler sent us a portion of the "back-up" material used in deriving their cost estimates. These data are enclosed for your files.

While admitting the fallacy of comparing cooling system cost data for optimized plant designs with cost data for back-fitted plants, Mr. Butler himself does just that. He compares the data contained in our report on the "Feasibility of Alternative Means of Cooling for Thermal Power Plants Near Lake Michigan" to the estimates he provides for backfitting the Zion plant. In our view this is unjustified.

Limited data on backfitted cooling facilities are available. For example, EEI presented data to the Joint Committee on Atomic Energy (Hearings on Environmental Effects of Producing Electric Power, Part 2, Vol. 1, page 1823) which showed that the cost of providing "thermal effect control" using wet towers by "retrofitting on an existing plant" is $10 to $12 per kilowatt. In this same reference EEI contends that retrofitting with dry towers is "probably not possible." In his statement before the September, 1970 Workshop Session of the Lake Michigan Enforcement Conference, Mr. D. H. Williams, Assistant Vice President and Chief Mechanical Engineer, American Electric Power Service Corporation, provided estimates on backfitting the Donald C. Cook nuclear power plant. He suggested that three natural draft towers, each 500 feet tall and 400 feet in diameter would be required for the 2 unit, 2100 MWe plant at a total cost of 20 million dollars ($9.5/KW). An additional 12 million dollars ($5.7/KW) would be required for "the pumping and transport systems through the cooling towers and back to the plant." In addition, Mr. Williams estimated that summertime conditions would increase turbine back-pressures from 2.9 inches of mercury to 4.3 inches of mercury"...causing a load curtailment of approximately 40 MW per unit or some 80 MW for the total plant." Mr. Williams felt that dry towers "...are totally out of the question" for the Cook plant.

While it is difficult to compare the specific cost items provided by Mr. Butler with these more general data, it does appear that the Commonwealth Edison costs are excessive. For example, excluding special earth work, the total capital investment costs for Zion's wet system equals $28/KW compared to the $12/KW EEI value and the $15/KW figure given by Mr. Williams. In terms of capability loss, Commonwealth Edison's estimate for Zion of 179 MW is more than twice as much as the 80 MW figure provided for the D. C. Cook plant by Mr. Williams. Thus it seems evident that Commonwealth Edison has imposed some extreme constraints to come up with their estimates. It would be impossible to examine in detail all relevant items appearing in their cost list, but several factors can be discussed:

(1) Dry Cooling Towers

A prime example of an unsound groundrule is the decision to backfit an existing plant with a dry cooling system. Mr. Butler presents cost data for a technically possible but economically unrealistic dry cooling system. Dry cooling systems for large power plants will not use standard surface condensers. Direct contact condensers in combination with turbines operable at high back pressures are required. As Mr. Butler notes, such a configuration would provide much lower cooling system costs than that shown in Exhibit C. We would agree with Mr. Williams and assert that backfitting with dry cooling towers is "...totally out of the question."

(2) The Hybrid Wet Mechanical-Natural Draft Cooling Tower

The constraints leading to the selection of a non-conventional, hybrid wet cooling tower are examples of other unduly restrictive assumptions. For example, conventional mechanical draft towers were not selected because of possible fogging. While the potential for fog problems exists at the Zion site, the selection of a unique and untried cooling device costing millions of dollars more than conventional units is based on supposition rather than hard facts. The analysis of fog potential presented in our feasibility report indicates that meteorological conditions leading to a high probability for fog occur less than 1 percent of the time near Zion. A more rigorous analysis of the potential for fog from conventional mechanical draft towers would be advisable, especially since the cost savings would be substantial if conventional units were practical.

If it is found that fog problems are severe enough to cause visual obstruction on highways or in populated areas, an evaluation of fog control measures should be made. Since the potential for fog problems exists only during a small portion of the year, the use of fog control devices at the towers may be practical. Heating the air-water vapor tower effluent can prevent the formation of an extensive visible plume. Also, variations in cell loading and number of cells per tower should be evaluated. The capital and intermittent operating costs of fog control measures may be substantially less than the increased costs of the hybrid tower system.

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The use of a 250 feet limit on tower height is based upon the heights of other obstructions around the Waukegan airport. There is at the present time an FAA regulation limiting the minimum altitude approach to that airport at 600'. It may be possible that FAA would consider modifying this regulation to allow for the presence of a natural draft tower in the vicinity of the airport. Since the overall cost of conventional natural draft towers would be millions of dollars less than the hybrid system, such an investigation would be prudent.

(3) Capability Losses

A major cost item in the data supplied by Mr. Butler is for capability losses due to lower efficiency at high back-pressures and auxilary power required for pumps and fans. Mr. Butler assigns a value of $37,142,000 to this capability loss for the wet mechanical draft tower system (179 MW x $207/KW). In assigning an equivalent capital investment figure of $37,142,000 to this capability loss, it is obvious that the economic benefits of additional capacity during the non-critical weather conditions were not evaluated. Using economic data provided by Commonwealth Edison and assuming that an additional 150 MW would be available for distribution 75 percent of the year at the stated 70 percent capacity factor, we computed that at power value of 5 mills/KWH the equivalent capital "gain" over the 30 year plant life would be $23 million. Thus the net cost penalty due to capability loss should be $14 million ($37 million minus $23 million). In the event that the extra capability of the plant is not able to be sold then Commonwealth Edison should seriously consider the use of lower cost gas turbine peaking units which would provide the needed capability during the relatively short periods of time when severe summertime weather cause excessive capability losses. At $100/KW the use of these units would make the equivalent capital investment for capability loss $17.9 million rather than $37.1 million. Thus, in either case, it appears that the value assigned to capability loss is excessive.

(4) Top Charges

Top charges are assigned at a rate of 12-1/2 percent of the total capital investment costs. Naturally, if these capital costs could be reduced by selection of more conventional systems, the top charges would also be reduced.

(5) Cost to the Consumer

In Exhibit E, data are presented which show the additional monthly cost to the residential consumer is 68¢/month for the wet mechanical draft cooling tower system. This occurs when the burden of the total increase in Zion's production cost is distributed over Commonwealth Edison's 2.31 million residential consumers.

In our opinion the residential consumer in the Commonwealth Edison service district is being unfairly asked to bear the total burden of cost (see *1. on Exhibit E). In 1969 residential consumers accounted for 24.5 percent of the total KWH's sold by Commonwealth Edison. Industrial consumers used 39.9 percent and commercial consumers 23.3 percent; the remainder going to losses. If we assume that the residential consumers of Commonwealth Edison also consume 100 percent of the goods and services provided by the industries and commercial establishment in the service district, then the method used by Mr. Butler to assign the cost increase is correct. However, it seems highly unlikely that this is the case. Heavy industrial goods produced in the Chicago area are sold throughout the U.S. and even the world and any product cost increase due to increases in power cost would be distributed to these wide ranging customers. Also the Chicago area supplies commercial services to large numbers of people which do not buy residential power from Commonwealth Edison. In addition, one should evaluate the cost increase on the basis of 1973 consumers rather than 1969 consumers since Zion will only then be fully "on-line."

Assuming that the residential consumers of Commonwealth Edison purchase 20 percent of the output of industrial goods and 75 percent of the commercial services of Commonwealth Edison's industrial and commercial customers one can show that the residential consumer should pay only 24.5 percent + (0.2) (39.9 percent) + (0.75) (23.3 percent) = 50 percent of the cost increase, whatever that true cost may be. At any rate, the 68¢/month or 6.5 percent cost increase to the residential consumer is unrealistically high.

In conclusion, we believe that Commonwealth Edison's cost estimates for backfitting the Zion plant with a closed cycle cooling system reflect excessively strict design assumptions and are thus too high. While the total plant cannot be optimized, certainly alternative backfitted systems and operating techniques could be evaluated to minimize the economic impact of installing such systems. In this respect, the following evaluations should be made for conventional wet towers:

1. A more rigorous evaluation of the fogging potential of conventional wet mechanical draft towers.

2. Feasibility studies and cost estimates for wet mechanical draft tower fog control during critical meteorological conditions.

3. An evaluation of the cost of raising the minimum approach to Waukegan airport to allow conventional wet natural draft towers.

4. An evaluation of the economic benefits derived from increasing the capability of the plant.

5. An evaluation of the use of low cost gas peaking units to be used during periods of capability loss.

Finally, Commonwealth Edison should provide data which more realistically reflect the increase in cost which their residential consumers will bear. In this respect, an evaluation of the portion of industrial load which will be passed to consumers outside the Commonwealth Edison service district would be most valuable.

Bruce A. Tichenor

Mostafa A. Shirazi

Enclosures

cc: Bartsch
Stein

D-1

ENVIRONMENTAL PROTECTION AGENCY

November 8, 1972

Mr. Bart Hoglund
Argonne National Laboratory
Center for Environmental Studies
9700 South Cass Avenue
Argonne, Illinois 60439

Dear Mr. Hoglund:

At the request of Dr. Tokar of your staff we enclose some comments by our Corvallis laboratory on testimony by Dr. Pritchard and others at the Lake Michigan Enforcement Conference.

We understand that Commonwealth Edison has already contacted you regarding these comments.

Sincerely yours,

ORIGINAL SIGNED BY DALE S. BRYSON

Dale S. Bryson, Chief
Enforcement Branch

Enclosure

cc: F. Rainwater / ltr. only

D-1-a

ENVIRONMENTAL PROTECTION AGENCY
Pacific NW Environmental Research Lab, NERC-Corvallis

REPLY TO ATTN OF: Research Sanitary Engineer
National Thermal Pollution Research Program

DATE: October 11, 1972

SUBJECT: Reviews of Presentations to the September 21, 1972, Session of the Lake Michigan Enforcement Conference

TO: Dale S. Bryson, Deputy Director
Enforcement Division
Region V

As requested by your memorandum of September 25, 1972, members of the National Thermal Pollution Research Program staff have reviewed three of the subject presentations:

Presentation by	Reviewed by
O.D. Butler	B. A. Tichenor
D.W. Pritchard	M. A. Shirazi
G.F. Lee	G. R. Nelson

The following comments are submitted for inclusion into the record of the Conference and for possible presentation to the upcoming Conference session on thermal discharges.

Statement of O.D. Butler

Mr. Butler's statement contains essentially the same information and data as his previous statement of November 5, 1970, presented to the Illinois Pollution Control Board. Review comments on that statement were prepared by Tichenor and Shirazi and transmitted to Region V via memorandum of January 15, 1971. In addition, that memorandum was entered into the record of the March 23-25, 1971, session of the Lake Michigan Enforcement Conference. I believe that the comments presented in our January 15, 1971, memorandum are still valid and pertinent, and a copy of the memorandum is enclosed. In support of and in addition to our memorandum, the following comments on Mr. Butler's September 21, 1972, statement are provided:

1. The cost estimates for dry towers (Exhibit A) are of little interest, since the backfitting of Zion with dry towers has, to my knowledge, never been considered a reasonable alternative.

2. As pointed out by Mr. Butler on page 3, our original September, 1970, data were based on the optimal design of cooling systems for new plants. Thus, his comparison of backfitting cost data with our September, 1970, data is unreasonable.

3. Mr. Butler's contention on page 4 that capability losses at Zion should be made up by the cost of the Zion plant ($207/KW) is reasonable, when base loading this extra capacity is planned, but he

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fails to account for the increased revenues which would result from this increased capacity during the majority of the annual cycle when capability losses will not occur. If this added capacity will indeed be base loaded (as stated by Mr. Butler on page 4), then the additional revenue resulting from the increased base load capability of Zion must be included in the cost estimate (see page 3 of our January 15, 1971, memorandum). Mr. Butler did not consider this factor, and thus his cost estimate for capability loss is high by at least a factor of two.

4. Mr. Butler contends on page 4 that his cost estimates have "... been confirmed by estimates and actual experiences of other utilities which are in the process of trying to backfit stations on Lake Michigan." Two problems arise from this statement:

a. To my knowledge, there is no "actual experience" for backfitted power plants on Lake Michigan. Only the Palisades Plant is committed to backfitting, but their new cooling system is not yet completed.

b. Cost estimates on backfitting from other power companies do not "confirm" Mr. Butler's estimates for Zion. Relevant cost data contained in the Argonne report "Summary of Recent Technical Information Concerning Thermal Discharges Into Lake Michigan" (pages 102-109) contain a wide range of cost estimates. The following table summarizes a portion of this information and compares it to Mr. Butler's data:

Backfitting (Mechanical Draft Towers) Cost Data (Argonne)

Plant	Cost Increase* ($/KW)	Increased Busbar* Cost (Mills/KWH)
Pulliam	28	0.80
Kewaunee	45	0.95
Point Beach	43	1.15
Waukegan	18	0.56
State Line	39	1.10
D. C. Cook	40	1.15
Zion (Butler) (Exhibit B)	56	1.63

Note that Mr. Butler's estimate exceeds the others both in terms of capital cost ($/KW) and increased busbar cost (Mills/KWH). In fact, Mr. Butler's estimates for Zion are two and three times higher than similar estimates for the Pulliam and Waukegan plants, respectively.

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*Computed (if necessary) assuming a capacity factor of 72 percent and an annual fixed charge rate of 18 percent in order to make the estimates comparable to Mr. Butler's data. (The 18 percent fixed charge rate, and thus the increase in busbar cost, is higher than normal.)

5. I object to the statement on page 4 where Mr. Butler says that Tichenor "...has increased his original estimate from 0.2 Mills/KWH to 0.6 Mills/KWH." Mr. Butler is confusing our original optimal cost data with data on backfitting cost which I presented at the State hearings in Michigan, Wisconsin, and Indiana. I have not increased my estimates, but I have presented data indicating that backfitting costs can be three times higher than the costs for optimally designed cooling systems. It is also interesting to note that Mr. Butler's estimates are based on a capacity factor of 72 percent and an annual fixed charge rate of 18 percent; while our data assume values of 82 percent and 14 percent respectively. Thus taking Mr. Butler's capital cost data (which I believe to be excessive for the reasons discussed above) and applying our values for capacity factor and fixed charge rate, we find the Mr. Butler's increased busbar cost of 1.63 Mills/KWH is reduced to a value of 1.13 Mills/KWH. Also, subtracting the approximately $20 million capitalized cost of the gain in revenue from the increased capacity (see page 3 of January 15, 1971, memorandum), the increase in busbar cost is further reduced to 0.95 Mills/KWH. Thus, if the comparisons between EPA estimates of backfitting costs and Mr. Butler's data are made with similar assumptions, the differences between the two estimates is reduced considerably. To paraphrase Mr. Butler (page 5), I am pleased to see that his comparisons can be made more realistic when uniform criteria are applied.

6. Finally, I noted with interest Mr. Butler's final comment (page 6) that his data are "...based on real costs to a real plant." This is inconsistent with his statement on page 2 where he emphasizes that his "...cost estimates are still design estimates" and that "...it is difficult to know the cost of building a one of a kind item until the project is completed." Thus, Mr. Butler's data are estimates in the truest sense of the word and not "real costs."

In summary, Mr. Butler presents cost estimates for the Zion plant which, in my opinion, are high both in terms of capital cost and increased busbar cost. Comparison with other cost estimates for backfitting fails to validate Mr. Butler's estimates. The use of uniform economic critieria to compare costs shows that Mr. Butler's cost estimates, while high, are not as divergent from other estimates as they first appear. Finally, the effect on consumer cost is not discussed and even using Mr. Butler's capital cost data, I feel that the consumer's cost would be increased by no more than 4 percent and would probably be less.

Statement by D. W. Pritchard

The following comments are related to the second portion (pages 7-12) of Dr. Pritchard's presentation, "Concerning the Winter Sinking Plume."

The sinking plume phenomenon in a surface jet adds a new complication to an already mathematically difficult problem. We agree with Dr. Pritchard that theory is inadequate at the present time to predict the onset of sinking for surface jets.

In the absence of adequate analysis, one must resort to conjectures and if, as in this case, some field data are available, maximum use of such data must be made. Care should be exercised to make appropriate use of the data for the application to other sites. Unlike generalized mathematical analyses, field data represent the unique situation under which they were obtained and extrapolation to other sites will be valid only with careful scaling.

Dr. Pritchard has used the field data on sinking plumes resulting from the Waukegan plant discharge to predict the same phenomenon for the Zion plant discharge. In the following section, we will reproduce his analysis and show that under reasonable assumptions agreement is obtained with some of his findings but divergent conclusions are reached as a consequence of his apparent change in strategy. Details are not spelled out and results are given too abruptly in the last paragraph (p. 11) of his September, 1972, statement to enable further scrutiny.

A computer program developed at MIT (Ref) for surface discharge was run at a typical low Froude number. We found that at some distance from the source, the excess plume temperature and velocity decay similarly. We shall use this observation in the scaling process, and we shall see below that this assumption produces agreement with Dr. Pritchard's analysis of the Waukegan data.

1. Analysis of Waukegan Data

a. February measurements

Initial excess plume temperature, $\Delta T_o = 17° \text{ F}$

Ambient temperature at location of observed sinking plume,
$T_a = 33° \text{ F}$

Sinking plume temperature at above location,
$T = 37° \text{ F}$

Excess sinking plume temperature, $\Delta T = 4° \text{ F}$

Dimensionless excess temperature ratio at which sinking plume was observed,
$\frac{\Delta T}{\Delta T} = \frac{4}{17} = 0.235$

Initial excess plume velocity, $u_o = \Delta u_o = 3$ ft/sec

Excess horizontal velocity of the sinking plume =
$\Delta u = 0.235 \times 3 = 0.71$ ft/sec
(agreement with Dr. Pritchard)

(Note that $\frac{\Delta u}{\Delta u_0} = \frac{\Delta T}{\Delta T_0}$ by assumption)

b. March measurements

Dimensionless excess temperature ratio at which sinking was observed $\frac{\Delta T}{\Delta T_0} = \frac{39-32.5}{16.5} = 0.394$

Excess plume velocity, $\Delta u = 0.394 \times 3 = 1.18$ ft/sec (agreement with Dr. Pritchard)

2. Scaling Procedure

Excess temperature and velocity ratios are functions of plume characteristics which are determined by local and upstream forces exerted on the plume. We assume that field data, while accounting for all these factors, exhibit their total influence in the dimensionless excess temperature and velocity ratios and cannot be characterized by the absolute magnitudes of temperature and velocity as implied in Dr. Pritchard's analyses. Based on this assumption, we continue to apply Waukegan's data to Zion.

3. Application to Zion Discharge

Initial excess temperature, $\Delta T_0 = 20°$ F

Initial velocity, $u_0 = \Delta u_0 = 9.3$ ft/sec

a. Sinking plume under February conditions:

Temperature of sinking plume, $\Delta T = 0.235 \times 20 = 4.7°$

Horizontal velocity of sinking plume,
$\Delta u = 0.235 \times 9.3 = 2.19$ ft/sec

b. Sinking plume under March conditions:

Temperature of sinking plume, $\Delta T = 0.394 \times 20 = 7.9°$ F

Velocity of sinking plume, $\Delta u = 0.394 \times 9.3 = 3.66$ ft/sec

We conclude, therefore, that the Zion plume sinks at a higher temperature than the Waukegan plume, both under March and February conditions. The excess temperatures of 4.7°F and 7.9°F have been predicted based on Waukegan data. These contradict Dr. Pritchard's 3°F maximum excess temperature of the sinking plume predicted under February conditions. We believe that the reason for this discrepancy is the use of 1.2 ft/sec absolute excess velocity as a universal scaling parameter in contrast to our use of dimensionless velocity ratios.

Statement by G. F. Lee

Dr. Lee's presentation attempts to show that the blowdown from cooling towers at the Zion Plant would be unacceptable from the standpoint of water quality degradation. While Dr. Lee presents information in an attempt to support this contention, we do not believe that his conclusions are justified. The following comments are provided on specific points within Dr. Lee's paper:

1. The statement uses a drift level of 0.1 percent of the total circulation rate (page 3). This is very excessive. The state-of-the art provides for drift levels of 0.002 percent and 0.005 percent from natural and mechanical draft cooling towers, respectively.

2. Throughout Dr. Lee's comments he compares the chemical concentration of cooling tower blowdown with the lake standards. It should be pointed out that a chemical concentration in the blowdown can exceed the lake standard and still be well below the effluent standard.

3. The discussion on the influence of ammonia is misleading (page 9). The study on which the statement is based is (1) undocumented and (2) may not allow for process leakage, which is not a problem in power plant cooling towers.

4. The effects of chemicals added to the lake due to water treatment will be minimal:

a. Chlorine (page 11) - power plant operations and math modeling indicate chlorine feed for biological control in cooling towers will have less impact on the receiving stream than once-through cooling. The reference to chlorine feed at Zion is unfounded since the plant will use mechanical condenser cleaning (Amertap) for fouling control.

b. Corrosion/scale treatments (page 10, 12-17) - modern power plants are designing out corrosion via alloy heat exchangers, concrete distribution lines, epoxy coated return lines, etc. Also corrosion and scaling are less of a problem than in the process industries, due to (1) steady-state operation, (2) low skin temperature, (3) high velocities and (4) low delta T's. The net result is the almost complete elimination of conventional treatment chemicals. The only chemical added in significant quantities is sulfuric acid for pH adjustment.

c. Phosphate contribution (page 14-15) - phosphorus will come from boiler blowdown - this will be present even with once-through cooling. For reasons cited in paragraph 4b, the phosphate issue in power plant cooling towers will be nil in a vast majority of the cases. Where deposit control chemicals containing phosphates are used, they will be of the organo phosphorus types. These chemicals contribute 80-95 percent less P when compared with phosphate. This is due to lower feed rates and chemical structure. Other alternatives such as non-phosphate anti-scaling agents can be applied.

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In summary, the general characteristics of cooling tower operation from the present state-of-the-art of the process industries cannot be used to predict the impact of cooling tower blowdown from future power plants. The basic reason is that the conditions for cooling water in the electric utility industry are unique. Power plants do not have the high skin temperatures, high temperature drops, and low flows of the petroleum/chemical industry, from which a great deal of information has been taken; nor do they have the complex distribution systems, the process leaks, the shell side cooling, the hybrid metallic surfaces, or the uncontrolled discharges of other industrial plants. Power plant cooling towers operating on Lake Michigan will not increase the total amount of chemicals in the lake, with the possible exception of sulfate due to pH control. This contradicts Dr. Lee's tone throughout his statement, which he summarizes on page 17-20.

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Guy R. Nelson

Reference

Stolzenbach, K. D. and D. R. F. Harleman, "An Analytical and Experimenta Investigation of Surface Discharges of Heated Water," Dept. of Civil Eng., Report No.16130DJU 02/71, EPA, Water Pollution Control Research Series, U.S.

Enclosure (1)

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D-1

UNITED STATES GOVERNMENT

Memorandum

TO : Director, Office of Enforcement and Cooperative Programs, Great Lakes Region, EPA, WQO

DATE: January 15, 1971

THRU : Chief, National Thermal Pollution Research Program

FROM : Chief, Hydrographic Branch and Chief, Controls Branch, National Thermal Pollution Research Program

SUBJECT: Costs of Backfitting at Zion Nuclear Power Plant

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The use of a 250 feet limit on tower height is based upon the heights of other obstructions around the Waukegan airport. There is at the present time an FAA regulation limiting the minimum altitude approach to that airport at 600'. It may be possible that FAA would consider modifying this regulation to allow for the presence of a natural draft tower in the vicinity of the airport. Since the overall cost of conventional natural draft towers would be millions of dollars less than the hybrid system, such an investigation would be prudent.

(3) Capability Losses

A major cost item in the data supplied by Mr. Butler is for capability losses due to lower efficiency at high back-pressures and auxilary power required for pumps and fans. Mr. Butler assigns a value of $37,142,000 to this capability loss for the wet mechanical draft tower system (179 MW x $207/KW). In assigning an equivalent capital investment figure of $37,142,000 to this capability loss, it is obvious that the economic benefits of additional capacity during the non-critical weather conditions were not evaluated. Using economic data provided by Commonwealth Edison and assuming that an additional 150 MW would be available for distribution 75 percent of the year at the stated 70 percent capacity factor, we computed that at power value of 5 mills/KWH the equivalent capital "gain" over the 30 year plant life would be $23 million. Thus the net cost penalty due to capability loss should be $14 million ($37 million minus $23 million). In the event that the extra capability of the plant is not able to be sold then Commonwealth Edison should seriously consider the use of lower cost gas turbine peaking units which would provide the needed capability during the relatively short periods of time when severe summertime weather cause excessive capability losses. At $100/KW the use of these units would make the equivalent capital investment for capability loss $17.9 million rather than $37.1 million. Thus, in either case, it appears that the value assigned to capability loss is excessive.

(4) Top Charges

Top charges are assigned at a rate of 12-1/2 percent of the total capital investment costs. Naturally, if these capital costs could be reduced by selection of more conventional systems, the top charges would also be reduced.

(5) Cost to the Consumer

In Exhibit [illegible] data are presented which show the additional monthly cost [illegible] residential consumer is 68¢/month for the wet mecianical draft cooling tower system. This occurs when the burden of the total increase in Zion's production cost is distributed over Commonwealth Edison's 2.31 million residential consumers.

In our opinion the residential consumer in the Commonwealth Edison service district is being unfairly asked to bear the total burden of cost (see *1. on Exhibit E). In 1969 residential consumers accounted for 24.5 percent of the total KWH's sold by Commonwealth Edison. Industrial consumers used 39.9 percent and commercial consumers 23.3 percent; the remainder going to losses. If we assume that the residential consumers of Commonwealth Edison also consume 100 percent of the goods and services provided by the industries and commercial establishment in the service district, then the method used by Mr. Butler to assign the cost increase is correct. However, it seems highly unlikely that this is the case. Heavy industrial goods produced in the Chicago area are sold throughout the U.S. and even the world and any product cost increase due to increases in power cost would be distributed to these wide ranging customers. Also the Chicago area supplies commercial services to large numbers of people which do not buy residential power from Commonwealth Edison. In addition, one should evaluate the cost increase on the basis of 1973 consumers rather than 1969 consumers since Zion will only then be fully "on-line."

Assuming that the residential consumers of Commonwealth Edison purchase 20 percent of the output of industrial goods and 75 percent of the commercial services of Commonwealth Edison's industrial and commercial customers one can show that the residential consumer should pay only 24.5 percent + (0.2) (39.9 percent) + (0.75) (23.3 percent) = 50 percent of the cost increase, whatever that true cost may be. At any rate, the 68¢/month or 6.5 percent cost increase to the residential consumer is unrealistically high.

In conclusion, we believe that Commonwealth Edison's cost estimates for backfitting the Zion plant with a closed cycle cooling system reflect excessively strict design assumptions and are thus too high. While the total plant cannot be optimized, certainly alternative backfitted systems and operating techniques could be evaluated to minimize the economic impact of installing such systems. In this respect, the following evaluations should be made for conventional wet towers:

1. A more rigorous evaluation of the fogging potential of conventional wet mechanical draft towers.

2. Feasibility studies and cost estimates for wet mechanical draft tower fog control during critical meteorological conditions.

3. An evaluation of the cost of raising the minimum approach to Waukegan airport to allow conventional wet natural draft towers.

4. An evaluation of the economic benefits derived from increasing the capability of the plant.

5. An evaluation of the use of low cost gas peaking units to be used during periods of capability loss.

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Finally, Commonwealth Edison should provide data which more realistically reflect the increase in cost which their residential consumers will bear. In this respect, an evaluation of the portion of industrial load which will be passed to consumers outside the Commonwealth Edison service district would be most valuable.

Bruce A. Tichenor

Mostafa A. Shirazi

Enclosures

cc: Bartsch
Stein

E-1

The attached messages were received at the conference while the conference was in progress.

E-2

western union **Telegram**

LLE070 (40)CCE169(0735)(1-004777C314)PD 11/09/72 0734
ICS IPMVEIF MVN
NOV 9 AM 7 42
ZCZC 00152 NL TDVE CHICAGO ILL 100 11-8 1055P CST
PMS FRANCIS MAYOR REGIONAL DIRECTOR DLY 150
ENVIRONMENTAL PROTECTION AGENCY
GOLD ROOM PICK CONGRESS HOTEL
CHGO

OBJECT TO PROPOSED CHANGES IN POLICY PERMITTING HEATED DISCHARGES IN LAKE MICHIGAN. PLEASE USE YOUR BEST EFFORT TO PRESERVE THE LAKE

HAROLD GRAHAM

---

western union **Telegram**

LLD114 (10)CCC220(1113)(1-009406C314)PD 11/09/72 1113
ICS IPMVEIC MVN
9 AM [illegible] 45
ZCZC 00146 TDVE CHICAGO ILL 19 11-09 1005A CST
PMS FRANCIS MAYO DLR DONT FONE
REGIONAL DIRECTOR ENVIRONMENTAL PROTECTION AGCY
GOLDROOM PICK CONGRESS HOTEL 520 SOUTH MICHIGAN AVE
CHGO

DO NOT COMPROMISE WATER STANDARDS IN LAKE MICHIGAN INSIST ON COOLING POWERS FOR ALL POWER PLANTS ON THE LAKE

DR AND MRS CHARLES FRAHM

E-3

western union **Telegram**

LLD101 (16)CCD199(1019)(1-007586C314)PD 11/09/72 1019 NOV 9 AM 9 19

ICS IPMVEIA MVN
ZCZC 00097 TDVE CHICAGO ILL 18 11-09 910A CST
PMS FRACIS MAYO DLY 150
REGNL DIR ENVIRONMENTAL PROTECTION AGENCY GOLD ROOM
PICK CONGRESS OTEL
CHGO

MR MAYO:

WE MUST HAVE COOLING TOWERS AT COOK NUCLEAR CENTER TO SAVE OUR LAKE

MRS C H SMILEY PROPERTY OWNER DUNEWOOD BRIDGEMAN MICHIGAN

---

western union **Telegram**

1972 NOV 9

LLC140 (01)CCG361(1330)(1-016410C314)PD 11/09/72 1328

ICS-IPMVEIB MVN
ZCZC 00140 TDVE CHICAGO ILL 12 11-09 1130A CST
PMS FRANCIS MAYL DLY 150
REGL DIR ENVIRONMENTAL PROTECTION AGENCY THE PICK CONGRESS HOTEL
CHGO

PROTECT LAKES. SCRAPPING ADOPTED POLICY DERELICTED. IF CONGRESS LOCK, APPEAL TO PUBLIC

FRANCES K WILSON

SF-1201 (R5-69)

E-4

western union Telegram

LLF017 (23)CCH002(0107)(1-000783C314)PD 11/09/72 0048
ICS IPMVEIB MVN
ZCZC 00009 TDV? CHICAGO ILL 27 11-08 1127P CST

1972 NOV 9 AM 12 40

PMS MR FRANCES MAYO DLR 1.50 DLR EARLY AM

REGIONAL DIRECTOR

ENVIRONMENTAL PROTECTION AGENCY GOLD ROOM

PICK CONGRESS HOTEL

CHGO

TO WAIVE THE REQUIREMENTS OF COOLING TOWERS ON THE

SF-1201 (R5-69)

LAKE MICHIGAN POWER PLANT IS A BREECH OF FAITH

AND A NEEDLESS RISK TO NEM AND ANIMALS AND PLANTS

RICHARD W BURKE

SF-1201 (R5-69)

E-5

western union **Telegram**

LLC034 (42)CCD015(0216)(1-001846C314)PD 11/09/72 0214
ICS IPMVEIB MWN
ZCZC 00036 NL TDVE CHICAGO ILL 100 11-09 1201A CST 1972 NOV 9 AM 3 42

PMS FRANCIS MAYO REGIONAL DIRECTOR ENVIROMENTAL

PROTECTION AGENCY DLR DONT FONE

520 SOUTH MICHIGAN AVE GOLD ROOM PICK CONGRESS HOTEL

CHGO

EPA OBLIGATIONS TO THE PEOPLE IS TO BE SURE

THERMAL POLLUTION IS NO THREAT TO THE

SF-201 (R5-69)

ENVIROMENT DONT LET UP ON THE POWER COMPANY

PHILLIP AND DENISE GARDNER

SF-1201 (R5-69)

E-6

The finalized joint recommendations of the Lake Michigan States and EPA for thermal and non-thermal issues, formulated at the Public Session held on November 9, 1972, follow in their entirety.

F-1

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
STATEMENT CONCERNING
LAKE MICHIGAN THERMAL PROBLEM

PUBLIC SESSION OF THE
LAKE MICHIGAN STATES AND THE
ENVIRONMENTAL PROTECTION AGENCY
November 9, 1972

The questions raised by the construction of several large power plants on the shores of Lake Michigan have been a matter of urgent concern to and have occupied countless hours of the Lake Michigan Enforcement Conference. In briefest summary I shall attempt to outline the facts underlying the problem. Six nuclear electric generating stations are in various stages of construction in the four Lake Michigan states; several of the plants are scheduled to be in full operation at various dates in 1973.

At the third session of the Lake Michigan Enforcement Conference (March 23-25, 1971) EPA Administrator Ruckelshaus proposed to the state conferees for their adoption a water quality standard whose implementation would require the installation of auxiliary cooling facilities at the nuclear power plants under construction. The essence of Administrator

Ruckelshaus' recommendation was that waste heat discharges located on Lake Michigan in excess of 1/2 billion BTU/hr which had not begun operation as of March 1, 1971 shall have closed cycle cooling facilities associated with their operation.

Under the Federal Water Pollution Control Act as amended through 1970, water quality standards consisted of three elements: criteria, uses, and an implementation plan geared to attain the criteria and uses. The new FWPCA states that best practicable control technology shall be achieved not later than July 1, 1977. However, if the application of best practicable control technology does not attain water quality standards then more stringent limitations will be required. It should be noted that the water quality standards which will be considered by the Environmental Protection Agency for approval or disapproval, will consist only of criteria and use designations. Implementation plans are no longer subject to approval by EPA as part of water quality standards. In place of implementation plans incorporated in the standards, the new Act imposes a continuing planning process requirement on each state which requires the state to have comprehensive control plans including implementation plans for all navigable waters within the state.

At the March 23-25, 19[illegible]1 session of the Lake Michigan Enforcement Conference, the conferees made certain findings and recommendations. Most of these findings and recommendations were approved by Administrator Ruckelshaus on May 14, 1971 and forwarded to the states for implementation.

Subsequent to the issuance of the approved findings and recommendations, the four Lake Michigan states took certain actions relating to implementing the conference recommendations. Basically these actions were consummated in the adoption by the states of thermal water quality standards. The principal elements of the adopted conference recommendations and those elements considered by the states for adoption as water quality standards were as follows: maximum temperature limits, specific definition of mixing zones, implementation schedules, and guides on restrictions on intake mechanisms, discharge plumes, and monitoring. The conference specifically adopted a recommendation which required closed cycle cooling systems on all new thermal waste dischargers above a certain size.

Recognizing the risk of summarizing what each state adopted, I have attempted to do that. The summary is as follows:

INDIANA: Essentially adopted all of the conference recommendations.

ILLINOIS: Essentially adopted all of the conference recommendations with the exception of the closed cycle cooling requirements on all plants not under construction as of March 1, 1971 and the plan of implementation on bringing older sources into compliance with the general conference recommendations.

MICHIGAN: Essentially adopted all of the conference recommendations with the exception of the closed cycle cooling requirements on new sources and the plan of implementation on bringing older sources into compliance with the general conference recommendations. The state did not adopt the mixing zone definition, leaving that determination to a case-by-case basis.

WISCONSIN: Adopted the monthly maximum criteria exempting certain areas from the requirements. Other requirements, including mixing zone and installation of closed cycle cooling, were not adopted.

Under the new Act the standards submitted to EPA by the four states must be approved or rejected by January 18, 1973. If EPA fails to take action by January 18, 1973, the standards submitted by the states will automatically be approved. It is EPA's intention to review and act on all of the Lake Michigan thermal standards by the required date. At this time it would appear that much of what is in the submitted standards is approvable.

This disposition of the pending thermal water quality standards will not, however, resolve the Lake Michigan thermal problem which faced the Lake Michigan Enforcement Conference in each of its sessions. We know that the thermal question is not readily resolvable not only from our own experience but from a reading of the new Federal Water Pollution Control Amendments of 1972.

Congress considered voluminous testimony in their deliberations on the new bill. On the basis of the evidence they concluded that best practicable control technology would be required for all municipalities and industries by July 1, 1977 and best available technology by July 1, 1983. Congress obviously felt on the basis of the testimony they heard that all of the answers were not in on the question of thermal pollution. While they recognized it as a pollutant and a problem, they saw fit to address the question in a special way in various sections of the Act.

Specifically, Congress provided for the establishment of a program to start to get some asnwers on the thermal problem. The new Act requires the Administrator, in cooperation with State, Federal, and public and private organizations, to conduct comprehensive studies on the effects and methods of controlling thermal discharges. In evaluating alternative methods of control, the studies are required to consider the state of the art, economic feasibility, including cost-effectiveness, and the total impact on the environment. The studies will consider methods of minimizing adverse effects and maximizing beneficial effects of thermal discharges. The results of the studies are to be reported not later than 270 days after October 18, 1972 and will be generally available. The results of the studies will be considered in the permit issuing process set up by the Act in developing thermal water quality standards. [See Sec. 104(t)].

Basically, to control all municipal and industrial discharges, the Act establishes a national permit system superseding the program set up under the Refuse Act. EPA is to determine what best practicable control technology is for various industries, and is to set effluent limitations within one year. EPA is to administer the permit program until such time as a state satisfies the Administrator that it has the statutory capability to manage the program, at which time the program will be transferred by EPA to the state. [See Sec. 402].

With regard to thermal pollution a special section provides that thermal discharges will be subject to the requirements of best practicable control technology (existing sources and those under construction) and best available control technology (new sources). [See Sec. 301 and 306]. If the thermal discharger can prove at a public hearing to the satisfaction of the Administrator (or a state if the permit authority has been transferred to the state) that the prescribed effluent limitation is not necessary to assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife, then the Administrator may impose a less stringent effluent limitation. [See Sec. 316].

A problem of great concern during past Enforcement Conference discussions has been the entrainment and destruction of aquatic biota during cooling water usage. The new statute provides that cooling water intake structures, unlike heated effluents, must immediately reflect the best technology available for minimizing adverse environmental impact. [See Sec. 316(b)].

On the basis of the new Act, the control of thermal discharges will be handled by the permit process. There are presently 27 Lake Michigan power plants in the pre-operational and operational stage. Additionally, there are numerous other lesser thermal discharges to the lake. The Act provides for the issuance of permits in the interim before final effluent limitations are promulgated by EPA, subject to such conditions as the Administrator determines to be necessary to carry out the provisions of the Act. However desirable it may be to make an early interim decision on what the statutory requirement of best practicable control technology is, we must fully appreciate the consequences. As regards significant thermal discharges, determination of best practicable control technology should be one meant to last for a number of years since the undertaking of most thermal control programs are usually long term projects. Construction of facilities and the engineering attendant to such construction is usually extended over years rather than months.

Until the promulgation of effluent limitations required by the statute has been effected, Lake Michigan power plant permit applications will be processed in the following manner:

1. Each permit application will initially be processed on the basis of compliance with Federally approved water quality standards. Under the statute if it is determined that best practicable control technology for thermal discharges requires

more than the achievement of water quality standards such as off stream cooling, the discharger will be required to install such facilities unless the discharger can demonstrate that a less stringent effluent limitation will assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife.

2. During the term of the permit a comprehensive monitoring program will be undertaken to evaluate the effects of the thermal discharges upon the environment.
3. The permit will be issued for a relatively short period (not to exceed three years). However, the permit shall be terminated whenever either of the following occurs: (1) a finding that the effluent being discharged does not assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife, or (2) the promulgation of final effluent limitations defining best practicable control technology for thermal discharges.

We must proceed to see that other questions related to cooling water usage are addressed promptly. First on this list is the requirement to have cooling water intake facilities reflecting best technology available. To develop the necessary data base on this question, EPA is suggesting the formation of a technical committee to undertake the evaluation of existing data and to make appropriate recommendations to EPA and the Lake Michigan states. It is our suggestion that the committee should consist of two representatives named by each of the states and two persons named by EPA. It is my suggestion that Dr. Robert J. Zeller, Director, Region V EPA Surveillance and Analysis Division, chair this committee.

On another and more general problem, the EPA and the States have in the past discussed the need for adequate monitoring of programs to assess damage to the aquatic environment attributable to existing and planned cooling water uses. As required under the licensing procedures of the Atomic Energy Commission and under certain state requirements, a number of studies have been conducted to assess damage. As was discussed at the September session, it appears that criteria do not exist to trigger the installation of appropriate corrective measures should damage become evident. A mechanism is also lacking to make an overall assessment of the damage that may occur to the lake's eco-system from waste discharges scattered at various points around the lake. This lack exists because present studies are geared toward a local, or at best regional assessment of a problem and not to the impact on the overall lake. Both monitoring elements, i.e., local and lakewide are important to assess damage to the lake. To address this problem, I suggest the formation of a technical panel to be composed of at least three representatives from each Lake Michigan state and three representatives from the EPA. The state representatives may be other than state employees and should be members of the academic community, persons employed by utilities, and members of environmental and other citizens' groups. It would be my suggestion to have Dr. Andrew McErlean, Senior Staff Biologist in the Office of Enforcement and General Counsel in Washington, to chair this technical panel. Dr. McErlean is eminently qualified to head this most important group. The charge of this panel would be

> to review background information dealing with past, present and future studies relating to thermal discharges to Lake Michigan;
> to make assessments as to whether the individual studies concerning thermal discharges will adequately assess damage attributable to that cooling water use;
> to assess the pertinence of individual localized studies to monitor changes in the overall lake eco-system;
> and to recommend, as necessary, additional efforts that should be expended to assess environmental effects of the use of Lake Michigan water for cooling.

I am prepared to lend such assistance as I can to fashion the kind of a program which will collect and evaluate the facts and to assure maximum protection to the public resource, as well as fair play for the industry.

G-1

PUBLIC SESSION
OF THE
LAKE MICHIGAN STATES AND
U. S. ENVIRONMENTAL PROTECTION AGENCY

NOVEMBER 9, 1972

JOINT RECOMMENDATIONS OF
THE REPRESENTATIVES OF THE

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
INDIANA STREAM POLLUTION CONTROL BOARD
MICHIGAN WATER RESOURCES COMMISSION
WISCONSIN DEPARTMENT OF NATURAL RESOURCES
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

STATUS OF COMPLIANCE

Assessment of status of compliance is the foundation of any pollution abatement program. Without appropriate monitoring of status of compliance, there can be no measure of abatement progress. On the basis of reports presented at the last session of the Lake Michigan Enforcement Conference, the following was revealed:

Phosphorus Removal

Review of up-dated status of compliance information submitted at the Conference indicates that waste treatment facilities serving over three-fourths of the population in the basin subject to the phosphorus removal requirement are anticipated to reach compliance by the December 1972 deadline. When this prediction is confirmed, substantial compliance with the Conference requirements will have occurred. The Lake Michigan States and EPA believe that all reasonable methods should be utilized to meet the December 1972 deadline.

Industrial Waste Control

Three-fourths of the industrial waste sources listed on the existing compliance schedule meet Conference requirements. The current listing of industrial waste sources should be reviewed to determine if all sources of pollutants which may have an adverse impact on Lake Michigan are covered.

Combined Sewers

Basin-wide progress in meeting this requirement has been unsatisfactory. It should be recognized that the final date for compliance under approved Federal-State water quality standards is 1977 for each of the States.

Disinfection

Only three dischargers out of 160 subject to this requirement are not presently in compliance. The provision of this basic health protection for the Lake Michigan Basin is a significant accomplishment.

Recommendations

In view of the present status of compliance with the Conference requirements outlined above, the following is recommended:

1. All point sources of phosphorus input to Lake Michigan subject to the phosphorus removal deadline of December 1972 which are now behind schedule should be reviewed and where feasible should be required to utilize interim facilities to effect the maximum phosphorus reduction by the deadline date.
2. Industrial waste sources which are behind Lake Michigan clean-up schedules and which have not been subjected to enforcement action resulting in an acceptable program should be given high priority in issuance of discharge permits.
3. Each State should, by April 1, 1973, prepare a detailed listing of municipalities subject to the combined sewer control recommendation. Each State agency should inititate a program which would require each municipality with a combined sewer overflow problem to prepare, by December 31, 1973, a report which should contain the following as a minimum:
    - A. A delineation of the areas involved in the problem.
    - B. Identification of specific engineering solutions to control or treat combined sewer overflows.
    - C. Estimate of the cost.

Each State should, by September 1, 1973, prepare a ranking of the combined sewer overflow problems in order of priority needs for correction. The existing Conference recommendation and water quality standards deadline for establishment of control or treatment of combined sewer overflows is July 1977.

4. By February 15, 1973, the States shall prepare an evaluation of the non-public waste discharges to surface waters in the Lake Michigan Basin. The evaluation should identify the quality and quantity of wastes discharged and whether such a discharge has an adverse impact on the water quality of Lake Michigan.

CHLORIDES

Present knowledge has not firmly established that existing chloride levels in Lake Michigan are interfering with the beneficial uses prescribed by Federal-State water quality standards. However, in view of the fact that chlorides are persistent, the States and EPA believe controls above those presently in progress on discharges of chloride waste should be established. It is recommended that:

1. The States in cooperation with EPA, through existing or future permit programs, endeavor to limit the loading rate for each State to the minimum feasible level.
2. The States should initiate detailed studies to examine chloride contributions from land run-off.

PHOSPHORUS

The serious adverse impact of present phosphorus discharges upon Lake Michigan is well established. It is recognized that the 80% basin-wide restriction adapted in 1968 was a positive step towards correcting this problem. However, it is agreed that additional measures are necessary.

It is therefore recommended that:

1. The existing 80% phosphorus requirement of the Lake Michigan Enforcement Conference should be supplemented by a 1 mg/l total phosphorus objective for municipal effluents. However, where present reductions already exceed this level, or where more stringent levels are feasible, they should be sought and maintained. Facilities of less than 2500 population equivalent would be exempt from the additional requirement. Each state should prepare, as soon as possible, an evaluation of the additional treatment facilities necessary and cost of same to upgrade treatment form the 80% present phosphorus removal requirement to the 1 mg/l objective; such information to be evaluated by the States and EPA as soon as possible but no later than December 31, 1973, and an appropriate schedule developed for obtaining the 1 mg/l objective shortly thereafter.
2. The States and Federal Government should endevor to promote the utilization of effective soil conservation techniques in order to reduce the amounts of phosphorus reaching the Lake from non-point sources.

3. Additional research and monitoring regarding the trophic status of Lake Michigan and the basic relationship between nutrient inputs or other limiting elements and eutrophication should be conducted to provide a basis for controls beyond those thus far recommended.

PESTICIDES

DDT, a chlorinated hydrocarbon, has been found at unacceptable levels in some fish used for human consumption. Reductions in DDT use initiated in 1969 are to culminate in a complete ban in the Lake Michigan Basin on January 1, 1973. It is important to obtain further evidence of reductions in DDT levels in Lake Michigan fish already noted by the Bureau of Sport Fisheries and Wildlife, Ann Arbor Laboratory. It is recommended that:

1. The Bureau of Sport Fisheries and Wildlife continue and intensify fish sampling for the purpose of establishing trends in pesticide residues. The EPA will coordinate with the BSF and W in monitoring findings and will report to the States on July 1 or each year the results of monitoring program.
2. The States should endeavor to secure passage of adequate legislation to record usage of clorinated hydrocarbons and other pesticides.

POLYCHLORINATED BIPHENYLS (PCB)

The States and EPA believe that PCB is a significant pollutant in the Lake Michigan Basin and that it is imperative that present PCB levels be reduced if not eliminated. It is therefore recommended that:

1. All significant sources of PCB within the basin shall be promptly identified through State-managed surveys, comparable to those now in effect in Michigan and Wisconsin, and each State shall prepare a progress report by October 1, 1973 as to the location of the identified sources.
2. Upon identification of any source of PCB in the basin, the State within which the source is located shall take immediate steps to eliminate, or if this in not practicable, to reduce each such discharge to an absolute minimum. Each State shall prepare a report by December 31, 1973.
3. Each State will institute by January 1, 1973 a surveillance and monitoring program on the tributaries and nearshore waters for the purpose of determining PCB trends in the aquatic environment and to gauge the effectiveness of the program for reducing if not totally eliminating man-made PCB discharges. The results of such surveillance and monitoring shall be prepared by the end of the calendar year.

PHTHALATES

The occurrence of phthalate residues has been established in the Lake Michigan Basin, principally in samples of water, sediment, and aquatic organisms. Though research data are presently limited, the States and EPA are concerned with phthalate contamination of the environment. It is therefore recommended that:

1. Comprehensive State surveillance of municipal sewage treatment plants, industries, domestic water intakes and fish be initiated to determine phthalate trends in the aquatic environment. Such a program should be instituted by March 1973, and an outline of each program should be prepared at that time. A progress report should be prepared by the States by December 31, 1972.
2. EPA accelerate its present research program to determine the levels that are toxic to aquatic organisms.
3. As toxicity data becomes available, the States should institute the necessary control programs.
4. The Federal Food and Drug Administration be requested to further evaluate the phthalate problem to determine whether an action level for fish for human consumption presently needs to be set.

SELECTED TRACE METALS

Selected trace metals are found in the water and particularly in the sediment of Lake Michigan and many of its tributaries.

Although some data are now available with respect to heavy metals concentrations, there is not a sufficient base at this time upon which to predicate a precise control program. It is therefore recommended that:

1. EPA and the State agencies should establish high priorities within their research programs to develop acute toxicity levels (TLm) for selected metals using Lake Michigan water and various life stages of Lake Michigan fish.
2. The States should survey and report commencing July 1973 on the inputs of metals to the Lake Michigan Basin, based on information obtained from industrial permit and monitoring programs. Sewage treatment plant effluent should also be monitored to determine the input of metals from this source. The report should delineate the source and level of discharge. The extent and frequency of monitoring should be determined after a case-by-case review.
3. Each State shall endeavor through a control program to decrease to the maximum extent practicable the input of selected trace metals into the Lake Michigan Basin whether from industrial or municipal sources.
4. The EPA shall determine research needs relative to coordinating a program to determine the input of selected trace metals from rainfall.

G-11

TASTE AND ODOR PROBLEMS

There has been an increasing problem of taste and odor due to fungi and/or algae in water supplies drawn from Lake Michigan, particularly in the vicinity of the Door County Peninsula. This problem has reached significant proportions. It is therefore recommended that:

1. The offensive taste and odor problem in the Green Bay Area of Lake Michigan should be further investigated to confirm the source. State and Federal investigations have laid important groundwork in this area and should be expanded. A joint EPA-Wisconsin-Michigan task force should be appointed to serve as a coordinating body for this expanded effort.
2. Research on water treatment methods for removal of taste and odor producing compounds should be expanded by the U.S. Environmental Protection Agency.

TOXIC SUBSTANCES COMMITTEE

RECOMMENDATION

The work of the Pesticide Committee has broadened its studies over recent time to include investigation of toxic substances other than pesticides that find their way into Lake Michigan Basin receiving waters and hence Lake Michigan. It is, therefore, desirable to create a new study group which has as its main objectives the continued and intensive evaluation of the nature, extent and relative toxicities resulting from the use and subsequent discharge of any and all toxic substances. The States and EPA thereby recommend that a Toxic Substances Committee be established to be under the chairmanship of Dr. Donald I. Mount. The new Committee will be composed of technical expertise from each Lake Michigan basin state with overall technical guidance provided by the Chairman. The Committee will develop semi-annual reports, commencing July 1, 1973, wherein the Committee's progress, findings, needs, and recommended control programs are discussed. Upon completion, such reports shall be provided to each of the State water pollution control Administrators and the EPA Regional Administrator. The work of the Pesticide Committee will be incorporated into the efforts of the Toxic Substances Committee.

*U.S.Government Printing Office: 1974 — 751-197